

Catalogue of the
Anatomical and Pathological
Preparations of
Dr. William Hunter

In the Hunterian Museum, University of Glasgow

By JOHN H. TEACHER

VOL. II

Glasgow
James MacLehose and Sons
Publishers to the University
1900

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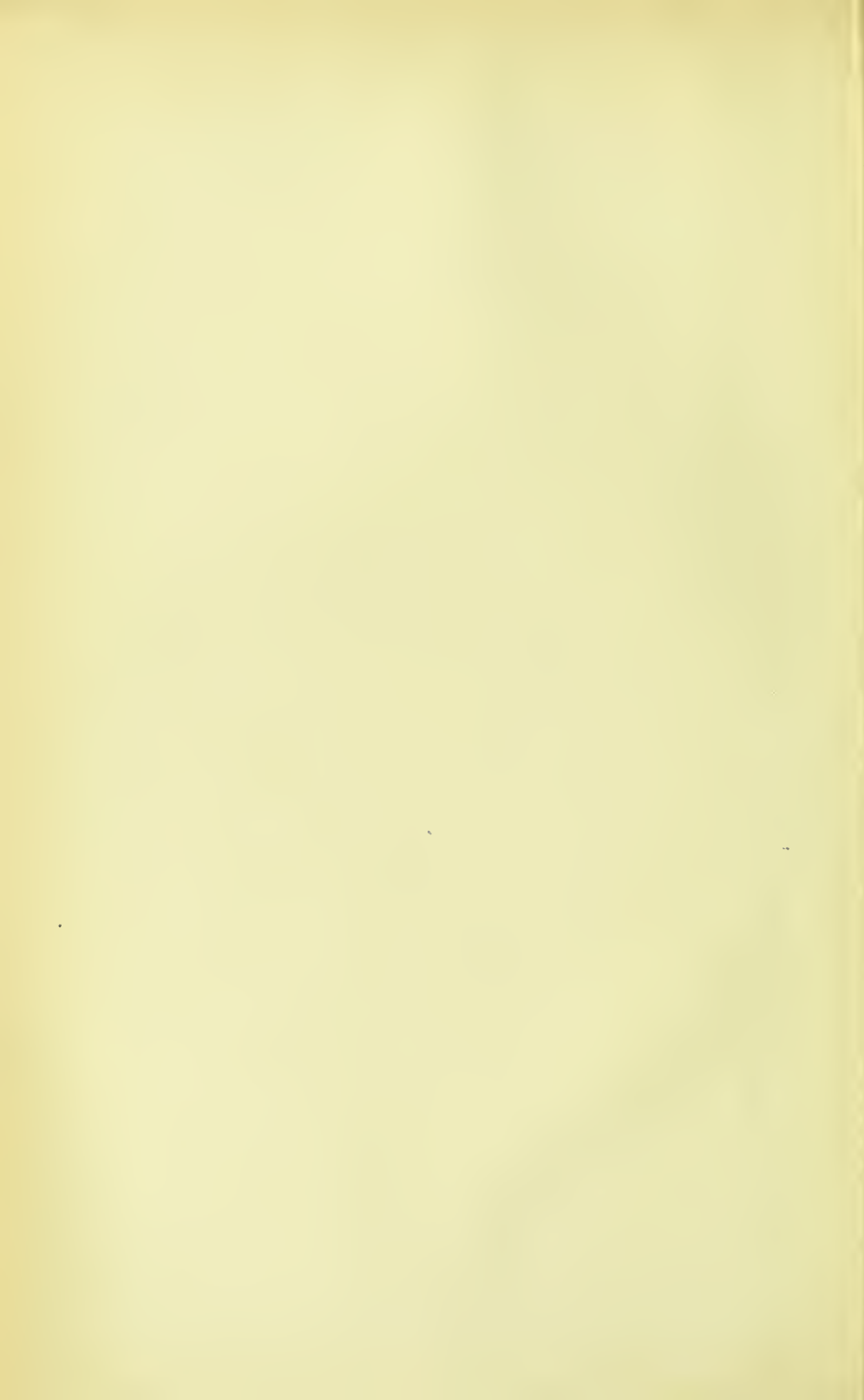
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Catalogue of the
Anatomical and Pathological
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Dr. William Hunter

In the Hunterian Museum, University of Glasgow

Catalogue prepared by
JOHN H. TEACHER, M.A., M.B., C.M.

and published at the cost of the
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SERIES 29.

ANATOMY OF THE LIPS, GUMS, AND TEETH.

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A number of the specimens in the series belonged to the set of specimens of the teeth prepared by John Hunter while assistant to his brother, and were used in the preparation of his work on the *Natural History of the Human Teeth*. Not the whole set is here, so that many of the illustrations could not be identified with any specimen; but several were readily identified with their originals, and others correspond more or less accurately to specimens, though they could not with certainty be said to be representations of them. The references in the descriptions are to the volume of plates in Palmer's edition of John Hunter's works.

29.1. The Mouth of a Child.

Hunterian. GG. 20.

Lower part of the face, the cheeks removed and the mouth opened widely, showing the cavity and the lips, gums, palate, and tongue. None of the teeth had appeared above the gum. Finely injected red.

29.2. The Roof of the Mouth, the Gums, Alveolar Processes, and Upper Teeth. *Hunterian. GG. 21.*

The above injected red, showing the shape and vascularity of the hard and soft palate, uvula and gums, and a very fine set of upper teeth, all belonging to the permanent set, but only back to the first molars ; the second molars and wisdom teeth were still to come.

29.3. The Roof of the Mouth, the Gums, Teeth, and Lips. *Hunterian. GG. 22.*

Similar to the preceding, but with the lips not removed, showing, in addition to the points seen in the former, the vascularity of the lips, and the fine and highly sensitive papillae with which they are covered. A lens is required for the proper examination of this specimen. All but one of the deciduous incisors, the deciduous canines, and second molars are present. The permanent teeth, of which one incisor, two first bicuspid, and the first molars are present, are readily distinguishable by their greater size.

29.4. The Teeth and Gums. *Hunterian. PP. 26.*

“One half of the lower jaw from a young person, periosteum, gums, and teeth *in situ*, showing more fully the fringed villous border of the gums and their superior vascularity.” A lens is required for the proper examination of this specimen. Several of the teeth were already carious just above the edge of the gum and on the top. The wisdom teeth were on the point of erupting.

29.5. The Permanent Teeth. *Hunterian. PP. 2.*

A beautiful view of the teeth with their roots in the upper jaw, the alveolar processes having been dissected away to show their size, shape, and position relative to the jaw. The right wisdom and left wisdom and second molar of the lower jaw are wanting ; otherwise the set is perfect. Dry.

29.6. The Permanent Teeth. *Hunterian. PP. 82.*

The upper and lower jaw with a complete set of teeth in a perfect state of preservation, the alveolar processes dissected away on the left side, as in the preceding ; showing their size, shape, and

relations. The mental foramen is preserved intact. The right side shows the extent to which the teeth are embedded in the alveoli and the prominent ridges of the canine and incisor teeth of the upper jaw. Dry. The left side corresponds to Plate III., fig. 4, *loc. cit.* (*vide* introduction to series).

29.7. Lower Jaw, showing the Alveoli. *Hunterian. PP. 3.*

The teeth have been all removed to show the alveoli and especially the thickness of the alveolar processes, which, unless at the incisors, are thinnest on the outer side back to the last two molars, where the ramus joining the alveolar part of the jaw causes the outer wall to be much thicker and stronger. The importance of this in the drawing of teeth is obvious, the socket having to be broken in the direction of least resistance. The wisdom tooth on the left side is undeveloped. Dry. (*Loc. cit.*, Pl. I., fig. 2.)

29.8. The Alveolar Processes of the Upper Jaw.

Hunterian. PP. 3a.

The teeth removed to show the same as in the preceding. The thickness of the alveolar walls is about the same on both sides—rather thinner on the outside except the last two, where, as in the lower jaw, the inside is the thinner. Dry. (*Loc. cit.*, Pl. I., fig. 1.)

29.9. The Upper Teeth.

Hunterian. PP. 4.

The eight teeth from the left upper jaw of an adult, seen from the outside, mounted dry on blue paper, showing the three parts of the teeth—(1) body or crown, (2) neck, and (3) root. Uppermost are the two incisors—the central one much the larger—then the canine or cuspidate and the two bicuspid, and in the bottom row the three molars. The anterior molar has three distinct fangs—two to the outside and one to the inside; the second has the anterior outer and the inner fang coalesced; and the wisdom tooth is much smaller, and has one fang which looks like three coalesced.

29.10. Eight Teeth, showing the Parts of a Tooth.

Hunterian. PP. 15.

A canine, an incisor, two bicuspid, and four molars mounted dry on blue paper; the dentine of the root, being darker than the

enamel, shows the division into crown or body, neck and root. Three of the molars show a "drop of enamel on the roots of the teeth at some distance from the crown."

29.11. The Incisor Teeth.

Hunterian. PP. 37.

The incisors of the upper and lower jaws mounted dry, in two rows on blue paper, showing the shape of incisor teeth. They have one fang and a chisel-like cutting edge. The two middle upper incisors are much the largest.

29.12. The Canine or Cuspidate Teeth. *Hunterian. PP. 38.*

The four canine teeth mounted dry on blue paper. The two to the left, with longer roots bent at the point, belong to the upper jaw; they have the longest roots of all the teeth.

29.13. The Bicuspid Teeth.

Hunterian. PP. 39.

The eight bicuspid teeth mounted dry on blue paper, those of the upper jaw in the upper row. The root is single, but grooved as if originally double. Compare next specimen.

29.14. Bicuspid Teeth with Double Roots.

Hunterian. PP. 43.

Six specimens of the above, mounted dry on blue paper.

29.15. The Molar Teeth.

Hunterian. PP. 40.

The six left molar teeth mounted dry on blue paper, showing the outer aspect. The first and second upper have three fangs—two to the outside and one in; and the wisdom one fang, which looks like three coalesced. The lower have each two fangs arranged as anterior and posterior.

29.16. The Molar Teeth.

Hunterian. PP. 41.

Fifteen upper molars stuck by their crowns on blue paper to show the variety of the fangs, and the points of several of the fangs ground to show the pulp cavity.

29.17. The Roots of the Teeth. *Hunterian. PP. 42.*

A complete set of teeth of one side of the head, and an extra set of molars, "more perfect in their roots," stuck through blue paper.

29.18. Wisdom Teeth. *Hunterian. PP. 44.*

Nine wisdom teeth mounted dry on blue paper to show the varieties in their shape; the three fangs are most commonly "run together and bent, as this tooth has seldom room to grow."

29.19. Wisdom Teeth with Separate Fangs. *Hunterian. PP. 45.*

Four of the above with four fangs each. Dry on blue paper.

29.20. The Temporary or Deciduous Teeth. *Hunterian. PP. 22.*

The upper alveolar processes and gums with the "first" teeth (the deciduous dentition) complete—ten in number. Injected red and mounted dry on blue paper.

29.21. The Temporary or Deciduous Teeth. *Hunterian. PP. 21.*

"The lower jaw of a child about two years old containing the ten first teeth complete," with the gums. Injected red, dried and mounted on blue paper.

*Sections of Teeth illustrating their Structure.***29.22. Teeth in Transverse Section.** *Hunterian. PP. 7.*

A set of eight teeth ground down smooth on a stone almost to the middle of the crown, showing the difference between the enamel and the dentine and their relative thickness. Stuck through blue paper. Dry.

29.23. Teeth in Transverse Section. *Hunterian. PP. 8.*

"Six teeth treated in the same way, and afterwards the bony substance (dentine) burned with a red-hot iron till it became black,

while the enamel remains white." The blackening of the dentine is an indication of the greater amount of organic matter in it than in the enamel.

29.24. Teeth in Transverse Section. *Hunterian. PP. 9.*

Half of a lower jaw, the teeth *in situ* treated in the same way. The dentine is cracked in various directions, the enamel generally unaltered; the line of demarcation between the two very distinct. Dry.

29.25. Teeth in Transverse Section. *Hunterian. PP. 10.*

The whole upper jaw, the teeth *in situ* treated in the same way as the preceding. Mounted dry.

29.26. Teeth in Transverse Section. *Hunterian. PP. 12.*

Similar to the preceding, but treated with a "solution of silver in nitrous (nitric?) acid much diluted," colouring the dentine darker than the enamel and the contents of the pulp cavity darker still.

29.27. Teeth in Transverse Section. The Pulp Cavities.

Hunterian. PP. 18.

Nine teeth pushed through and fixed in holes in stiff blue paper, showing a transverse section of their cavities, which are nearly round, oval, or square, according to the shape of the tooth. A lower wisdom tooth ground down into the root shows four pulp cavities corresponding to four fangs, which from behind are seen to be coalesced, but with the division readily traceable. Dry. Some of these correspond to figures in Pl. V., figs. 2 and 19, *loc. cit.*

29.28. Teeth in Transverse Section. The Pulp Cavities.

Hunterian. PP. 19.

The lower jaw with the teeth *in situ* ground down and cleaned to show the above, as in the preceding specimen.

29.29. Teeth in Vertical Section. *Hunterian. PP. 20.*

Part of a lower jaw, the teeth *in situ*, ground down all round the outer side to give a view of the teeth in vertical section, showing the disposition and thickness of the enamel and dentine, the size of the pulp cavities, and the relation of the fangs to the bone of the alveolar processes. Dry on blue paper. Some of these teeth correspond to figures in Pl. V., figs. 2-19, *loc. cit.*

29.30. Teeth in Vertical Section. *Hunterian. PP. 13.*

A portion of the lower jaw, the teeth *in situ* ground on the outside and burned with a red hot iron, showing the amount of the enamel and its disposition relative to the dentine. Dry.

29.31. Teeth in Vertical Section. The Blood-vessels.

Hunterian. PP. 27.

"The whole lower jaw of a young person, periosteum, gums, teeth (deciduous set) *in situ*, highly injected red, steeped in an acid, divided perpendicularly through the teeth and dried." Mounted in turpentine. The hard parts of the teeth, translucent and avascular, contrast with the highly vascular gums, bone, and periosteum. The pulp is seen in the cavities of several, highly vascular, being the nutrient organ of the tooth. The first permanent molars are nearly developed, that on the left being through the gum. Behind are seen the germs of the second molars enclosed in highly vascular sacs. Only the crowns are developed, and their pulps and the thin layer of tissue covering the crowns are both highly vascular. On the left the inferior dental nerve is seen running below the roots of the teeth.

29.32. The Teeth in Vertical Section. *Hunterian. PP. 28a.*

The outer section of one half of a lower jaw treated in the same way as the preceding, but not dried. Mounted in spirit. The gums are beautifully preserved; the inferior dental nerve is seen partly turned out of its canal.

29.33. The Dental Periosteum. *Hunterian. PP. 33.*

"A nearly full-grown incisor, of the second (permanent) set, in the upper jaw, hanging by a slip of elegantly injected

periosteum." This periosteum clothes all that part of the surface of the tooth which is covered by the crusta petrosa (*i.e.* all that is not covered by enamel), and is highly vascular. The vessels are exceedingly minute. In turpentine.

29.34. The Dental Periosteum.

Hunterian. PP. 34.

Similar to the preceding; in turpentine.

29.35. The Dental Periosteum and Pulp.

Hunterian. PP. 35.

"Two incisors of the second set," injected red, similar to the preceding. One of them is split obliquely, showing the pulp cavity. A lens is required to distinguish the vessels in these specimens. In turpentine.

The Development of the Teeth.

29.36. The Development of the Alveolar Processes. Lower Jaw.

Hunterian. PP. 47a.

Four lower jaws of foetuses at various ages, macerated, dried, and mounted on blue paper, showing the above. The jaw is hollowed out into a deep gutter, in which arise septa of bone, dividing it into cells, those of the incisors being formed first. The cells are very large compared with the teeth they are to contain, in order to allow room for the formative structures. Correspond probably to figs. 1, 4, and 6 of Pl. VI., *loc. cit.*

29.37. The Lower Jaw of a Foetus at Seven Months.

Hunterian. PP. 51.

Showing the formation of the teeth in capsules embedded in the jaw bone. The beginnings of the whole ten first teeth are seen, only the crowns yet formed. The dentine caps of the central incisors have been removed, and that of the right first molar is raised up by a bristle, showing the highly vascular pulps. Of the dentine cap of the second left molar only the outer rim and the cusps are formed, and its centre is occupied by a mass of highly vascular soft tissue. The enamel cannot be

distinguished from the dentine is this preparation. Mounted in spirit on blue paper.

29.38. The Lower Jaw of a "Child at Birth."

Hunterian. PP. 49.

All the teeth are exposed, showing the crowns of the ten deciduous teeth fully formed. The crowns have been developed from as many points of ossification as there are cusps, and the germ of the first molar, which is also exposed, shows this—the shape of the crown is there in soft vascular tissue, but only the outer anterior cusp of it has developed a cap of dentine. This cap is clearly distinguishable from the vascular papilla; the tips of the other cusps are opaque, as if the dentine were beginning to cover them too. On blue paper, in spirit. Possibly the preparation from which fig. 3 of Plate VIII. was taken.

29.39. The Upper and Lower Jaws "of a Child at Birth."

Hunterian. PP. 63a.

Highly injected red and mounted in turpentine. All the teeth are exposed, showing the crowns formed but below the gum. The capsules and papillae of the teeth appear highly vascular.

29.40. The Vascular Tooth Papilla.

Hunterian. PP. 53.

An upper jaw "of a child at birth," with the canine and two molars *in situ*, highly injected red, decalcified, the soft parts removed, dried, and mounted in turpentine, showing the above shining through the transparent animal matrix of the teeth.

29.41. The Eruption of the Teeth.

Hunterian. PP. 81.

The lower jaw, tongue, and larynx of a child at "about nine or ten months old," highly injected red, and mounted in turpentine, showing three incisor teeth above the gum, and the fourth just on the point of breaking through, being covered only by a thin vascular membrane. Several of the other teeth are nearing the surface of the gum, and the germ of the first permanent molar is seen in its follicle, which has been cut open.

29.42. The Development of the Permanent Teeth.*Hunterian. PP. 64.*

Both jaws of a child "about two years old," injected red, showing the first dentition almost complete; sixteen teeth are fully formed, and the remaining four cutting, or just about to cut, the gum; also the germs of the incisors, and canines of the second set, developing in their sacs below and behind those of the first, and the first permanent molar in series behind the second milk molar (which gets replaced by the second bicuspid).

29.43. The Jaws of a Child "between Two and Three Years Old."*Hunterian. PP. 65.*

Showing the deciduous dentition complete, and not yet begun to be shed. The rudiments of about twenty of the permanent teeth are exposed in their follicles, as follows: In the upper jaw the central incisors higher up and behind the deciduous incisors, and notched in front where they abut on the roots of the latter; the lateral incisors and first bicuspid are more superficial, lying close together, and the canines lie above the space between them on the same level as the central incisors. The first molars, which have no predecessors, are already near the surface of the gum behind the second deciduous molars. Succeeding specimens show how this arrangement affects the order of eruption of the teeth.

29.44. The Jaws of a Child "perhaps Five Years Old."*Hunterian. PP 69.*

The age of the child is not certain, but it was certainly older than that from which the preceding specimen was obtained. The permanent teeth are seen in the same order as the preceding, but they are better formed; the upper incisors have lost the notch in their edges, and are more like their full-grown shape; the lower incisors are nearer the surface of the jaw. Unfortunately, the deciduous lower incisors and right upper incisors are amissing. The old description stated that "the incisors in the under jaw stand high, as if the alveolar process had left them, and they were ready to drop out." This is probably the specimen from which fig. 4 of Plate VII., *loc. cit.*, was taken. Dry.

29.45. The Jaws of a Child Four or Five Years Old.*Hunterian. PP. 69a.*

Similar to the preceding, and illustrating the same points. The set of deciduous teeth is complete. The permanent teeth are seen growing behind the deciduous, and above them in the upper, below them in the lower jaw.

29.46. The Lower Jaw of a Child about Four Years Old.*Hunterian. PP. 70.*

The follicles of the permanent teeth opened from behind, and the temporary incisors removed, showing the permanent teeth behind and below the deciduous, each in its own socket.

29.47. The Left Upper and Lower Jaws of a Child.*Hunterian. PP. 68.*

From a somewhat older subject, described as "about four years old," showing a further stage of development. The upper central incisor is down; the lateral incisor is about the level of the gum, and the corresponding deciduous tooth shed. The canine has grown considerably, but seems to have receded higher up into the jaw. Dry.

**29.48. The Right Upper and Lower Jaws of a Child
"about Eight or Nine Years Old."***Hunterian. PP. 71.*

The central temporary incisors are gone, and the permanent ones, not quite fully developed, occupy their places; the lower are more advanced than the upper. The roots of the lower lateral incisor and anterior molar of the first set are considerably shortened, giving place to the permanent lateral incisor and anterior bicuspid, which are rising beneath them. The first permanent molars are almost full grown, especially the lower, and the crown of the second (missing from the lower jaw) is well formed behind them. The canines, as in the preceding, lie very deep. Dry.

29.49. The Jaws of a Child "about Ten Years Old."*Hunterian. PP. 72.*

A beautiful preparation similar to the preceding, but more advanced. All the deciduous incisors are gone, the four permanent

central ones almost full grown, the lower lateral nearly in place, the upper lateral about the level of the gum, and twisted by the temporary canines, which are still in place and firmly fixed. The temporary molars are being pushed out. The permanent canines appear deeper than ever. The first permanent molars are complete. The original description says there were forty teeth visible; now five have been lost; their capsules show where they were. Dry.

29.50. The Development of the Molar Teeth.

Hunterian. PP. 73.

Part of a left lower jaw, the alveolar processes removed internally, showing the first two molars complete and the wisdom tooth with its crown about the level of the edge of the alveolus, and its root partly formed Dry.

29.51. The Formation of the Teeth.

Hunterian. PP. 24.

Two transverse sections of the lower jaw, gums, and teeth, showing the above. The crown of the tooth is seen enveloped in a vascular capsule. The enamel is most advanced, and covers the top and sides of the dentine cap; the hollow in the base of the latter is occupied by the highly vascular pulp, which, however, has shrunk very much, the specimen having been dried. Compare Nos. 29.65-69.

29.52. The Formation of the Teeth.

Hunterian. PP. 25.

Two more sections of the same jaw. Similar to the preceding.

29.53. The Formation and Growth of the Teeth.

Hunterian. PP. 61.

Twelve growing teeth in different stages, showing that the crown is developed first, in the form of several little caps of dentine, which coalesce (compare No. 38) and grow thicker from beneath, while the enamel is deposited on them from above. By the time the crown is complete, the enamel is thick and well-formed on the sides as well as the top of the tooth (compare Nos. 29.51 and 52). After this, the root begins to be formed by additions to the deep surface of the crown. Mounted dry on blue paper.

29.54. The Formation and Growth of the Teeth.*Hunterian. PP. 62.*

Nine growing teeth similar to the preceding. Mounted dry on blue paper.

29.55. The Shedding of the Deciduous Teeth.*Hunterian. PP. 66.*

Nine teeth of the first dentition, the roots more or less gone, having been absorbed in the process of shedding (compare 29.47, *et seq.*, and 29.63-64). The absorption has gone furthest in the centre of the teeth, leaving a sharp edge round the outside. They mostly show a crust of tartar round the neck, and two of them traces of caries also. Mounted dry on blue paper.

29.56. Third Dentition.*Hunterian. PP. 75.*

"An upper jaw from an old head; bicuspidæ and molares *in situ*, incisors and former cuspidati gone; two third set cuspidati are seen very large, their points just to be felt in the roof of the mouth."

*Comparative Anatomy of the Teeth.***29.57. Transverse Section of a Horse's Tooth.***Hunterian. PP. 16.*

A horse's tooth ground down to show the enamel not on the outside and top as in man, but in irregularly convoluted ridges alternating with the dentine, which lies bare between the ridges. This gives a rough ridged surface for grinding the hard vegetable food. Dry on blue paper.

29.58. Transverse Section of Horse's Tooth.*Hunterian. PP. 17.*

Similar preparation stained with nitrate of silver.

29.59. Transverse and Vertical Sections of Horse's Tooth.*Hunterian.*

Similar to the preceding, and also showing that the enamel ridges are formed from above and extend only a certain distance

into the tooth. One of the pulp cavities is indicated by a wire. Dry on white paper.

29.60. Section of an Elephant's Tooth. *Hunterian. PP. 17a.*

Showing the enamel in ridges mixed with the dentine as in the horse's tooth. Dry.

29.61. The Pulp of an Elephant's Tooth.

Hunterian. PP. 55.

The pulp is composed of a flat base produced into fibrous lamellae from 2 to 5 cm. high, on which is formed the dentine in oblong hollow masses alternating with sheets of enamel, as seen in the preceding specimen.

29.62. The Pulp of an Elephant's Tooth.

Hunterian. PP. 56.

Similar to the preceding.

29.63. Deciduous Tooth. Horse.

Hunterian. PP. 66a.

Showing the absorption of the root. Compare No. 29.55.

29.64. Shedding of a Deciduous Tooth. Horse.

Hunterian. PP. 74.

An almost complete permanent molar tooth with the remains of a deciduous tooth perched on the top of it, showing the above.

29.65. Growing Teeth. Calf.

Hunterian. PP. 54.

The lower jaw of a foetal calf ("slink calf") injected red and dissected to show the mode of formation of the teeth. The specimen shows the dental sacs of the right side laid open, the middle of the gum remaining, and the teeth forming from two rows of cusps—an outer and an inner—which later are united at their bases. On the left only the outside is dissected, and the dentine caps are removed to show the vascular pulps; the points of the inner cusps are seen near the surface of the gum.

29.66. Dental Sacs. Calf. *Hunterian. PP. 57.*

Left half of the lower jaw of a foetal calf ("slink calf") injected red, the lower part of the bone removed to show the highly vascular follicles in which the teeth are formed, and the inferior dental nerve and vessels running along their bases.

29.67. Dental Sacs. Calf. *Hunterian. PP. 58.*

The other half of the preceding, showing the dental sacs in side view. Injected red.

29.68. Dental Sacs. Calf. *Hunterian. PP. 59.*

"This capsule opened to show the growing teeth underneath, in the lower jaw of a slink calf." Injected red.

29.69. Growing Tooth. Calf. *Hunterian. PP. 60.*

"Growing tooth, hanging by its very vascular pulp, removed from the jaw, in ditto."

29.70. The Dental Periosteum. Monkey. *Hunterian. PP. 36.*

"Three monkey's teeth, stuck on green paper with gum arabic; periosteum beautifully injected in them all, and the internal cavity in the lowermost."

29.71. The Head of a Viper, showing the Poison Fangs. *Hunterian. PP. 80.*

These are two long fine recurved teeth which are grooved posteriorly for the duct of the poison gland.

SERIES 30.

INJURIES AND DISEASES OF THE LIPS, GUMS, AND TEETH.

30.1. Teeth Deformed by Stomatitis. *Hunterian. PP. 14.*

“Six incisors from the second set; the enamel waved like wreaths of snow, in the horizontal direction.” These teeth, particularly about the crowns, are small and covered with transverse markings, due to defective formation of the enamel. This is also defective over the edges of the teeth, exposing the dentine, which is worn down, and of a dark colour. The condition may be the result of mercurial stomatitis while the teeth were forming. It is not the condition characteristic of congenital syphilis. Dry on blue paper.

30.2. The Tartar of the Teeth. *Hunterian. PP. 76.*

Three rows of teeth coated with tartar, which is a concretion of earthy salts and mucus from the saliva, which forms on the teeth, chiefly about the edges of the gums, and is a frequent cause of ulceration of them. Dry on blue paper.

30.3. Caries of the Teeth. *Hunterian. PP. 77.*

Several rows of teeth, mounted dry on blue paper, showing different degrees of caries, ranging from a small hole in the side to exposure of the pulp and more or less complete destruction of the crown.

30.4. Enlargement of the Roots of the Teeth.

Hunterian. PP. 45a.

Twelve teeth mounted dry on blue paper, “every root having a sort of node or exostosis, by which its extremity is the largest part, and which would make the extraction of such teeth more difficult and dangerous.”

SERIES 31.

ANATOMY OF THE TONGUE, SALIVARY GLANDS, TONSILS, AND PHARYNX.

<i>The Tongue,</i>	1-11
<i>The Salivary Glands,</i>	12-27
<i>The Pharynx and Tonsils,</i>	28-32
<i>Comparative Anatomy,</i>	33-39

(a) *The Tongue.*

31.1. The Tongue with the Epiglottis and Hyoid Bone.

Hunterian. GG. 23.

Showing its anterior portion covered with papillae, which are of two kinds—fine pointed filiform, and less numerous, broad round-topped fungiform papillae. The posterior portion is devoid of papillae, but is studded with nodules having on their tops round orifices leading into crypts, which are lined with masses of adenoid tissue like that of the tonsils and receive the ducts of mucous glands. The boundary between these two areas is marked by a V, with the apex directed backwards, composed of nine circumvallate papillae. These are much larger than the other two forms, are surrounded by a trench into which open mucous glands, and on their sides are situated the taste buds.

31.2. The Tongue with the Epiglottis and Hyoid Bone. The Foramen Caecum.

Hunterian. GG. 24.

Similar to the preceding. Showing also a hole behind the apex of the V called the foramen caecum, which represents the orifice

of the obsolete duct of the thyroid gland, or, more accurately, the remains of the diverticulum of the alimentary canal from which the gland was developed; it never acts as a duct, but it occasionally gives origin to cysts.

31.3. The Tongue with the Epiglottis and Hyoid Bone.

Hunterian. GG. 25.

Finely injected red, showing the vascularity of the organ.

31.4. The Tongue and Hyoid Bone of a Child.

Hunterian. GG. 26.

Beautifully injected red. The foramen caecum well marked.

31.5. The Anterior Half of the Tongue. *Hunterian. GG. 27.*

Injected red to show the papillae. The median sulcus corresponding to the septum is well marked.

31.6. The Posterior Half of the Tongue with the Epiglottis.

Hunterian. GG. 28.

Injected red, showing the crypts.

31.7. The Posterior Half of the Tongue with the Epiglottis.

Hunterian. GG. 28a.

Similar to the preceding, but more finely injected red.

31.8. The Bilateral Symmetry of the Tongue and Larynx.

Hunterian. GG. 29.

The tongue and larynx of a child; "one carotid only has been injected red." The injection has not crossed the middle line, demonstrating the vascular independence of the two halves of the tongue and larynx.

31.9. The Epithelium of the Tongue. *Hunterian. GG. 30.*

Anterior portion of the tongue of a child, injected red, a portion of the cuticle turned down. Posteriorly the epithelial

papillae have been scraped off, showing the papillae of the corium.

31.10. The Epithelium of the Tongue. *Hunterian. GG. 30a.*

A child's tongue injected red, the cuticle raised and hanging free, showing the corium. Compare Nos. 31.34–31.36.

31.11. The Epithelium of the Tongue. *Hunterian. GG. 32.*

A furred tongue, showing the papillae abnormally large and white. In the centre the epithelial parts have been scraped off, showing the papillae of the corium highly vascular. (For Sections of the Tongue, see at the end of the Salivary Glands, No. 31.24 *et seq.*)

(b) The Salivary Glands.

31.12. The Parotid Gland. [*Hunterian.*] *GG. 11.*

Injected red, and mounted in turpentine, hanging by Steno's duct, showing its conglomerated structure. (Date cut on bottle, "Dec. 12, 1809.")

31.13. The Parotid Gland and Steno's Duct.

Hunterian. GG. 12.

Injected with mercury by the duct to considerable minuteness, showing the branching of the duct, in some places even to the terminal acini; the detached portion of the gland which lies on the cheek, called *socia parotidis*, also preserved and finely injected. Turpentine.

31.14. The Parotid Gland and External Ear.

Hunterian. GG. 12a.

A similar preparation, with the external ear, showing roughly their relations. Turpentine.

31.15. The Parotid Gland and Steno's Duct.

Hunterian. GG. 12b.

Similar to No. 31.13, but not so finely injected, and consequently showing the branching of the larger ducts better. Turpentine.

31.16. The Parotid Gland.*Hunterian. GG. 13.*

Similar to No. 31.13, but not so good. Duct broken short. Turpentine.

31.17. The Parotid Gland.*Hunterian. GG. 12c.*

Injected red. Being mounted in spirit it shows the vascular masses of gland contrasting with the white interlobular connective tissue.

31.18. The Parotid Gland.*Hunterian. GG. 14.*

Similar to No. 31.11. In turpentine.

31.19. The Submaxillary and Sublingual Glands.*Hunterian. GG. 14b.*

Injected with mercury by Wharton's duct; the principal duct of the sublingual, called Bartholin's duct, is seen joining that of the submaxillary near its termination.

31.20. The Submaxillary and Sublingual Glands.*Hunterian. GG. 14c.*

Similar to the preceding, but mounted in turpentine; the mercury has escaped from part of the ducts.

31.21. The Submaxillary Gland.*Hunterian. GG. 14d.*

Similar to the preceding, but the anterior half of the duct cut away with the sublingual gland. Shows the small portion of gland which extends along the duct, internal to the mylohyoid muscle. In turpentine.

31.22. The Submaxillary and Sublingual Glands.*Hunterian. GG. 14e.*

Showing the glands on both sides, Wharton's ducts injected with mercury, mounted almost in their natural relation to one another; the ducts of the sublingual not visible. In turpentine.

31.23. The Submaxillary Gland. *Hunterian. GG. 14f.*

Similar to No. 31.21, the whole length of Wharton's duct preserved. In turpentine.

31.24. The Tongue and Salivary Glands. *Hunterian. GG. 15.*

The left half of an adult tongue, divided longitudinally, the submaxillary and sublingual glands carefully dissected, and bristles placed in their ducts. The former discharges by Wharton's duct, which runs below the tongue for about 7 cm., to open close to that of its fellow of the other side, on a papilla at the side of the frenum linguae. The sublingual ducts (ducts of Rivini), instead of joining the submaxillary as in Nos. 31.19 and 31.20, open to the number of 6 or 7 by independent orifices in the floor of the mouth, along the lower edge of the tongue.

31.25. The Ducts of the Submaxillary Glands. *Hunterian. GG. 16.*

The anterior half of the tongue, part of the jaw and lower lip, showing bristles placed in the orifices of Wharton's ducts. The transverse section of the tongue shows the median septum. Injected red.

31.26. The Ducts of the Submaxillary and Sublingual Glands. *Hunterian. GG. 17.*

The lower part of the anterior half of the tongue, with the sublingual glands in section, and bristles placed in two ducts of Rivini and in one of the ducts of Wharton.

31.27. The Ducts of the Submaxillary, Sublingual, and Labial Glands. *Hunterian. GG. 18.*

A similar preparation to No. 31.25, hung by the lower lip, showing the orifices of the ducts of Wharton and Rivini and of two of the labial glands marked by bristles. Finely injected red.

(c) *The Pharynx and Tonsils.*

31. 28. The Pharynx.

Hunterian. GG. 36.

The upper part of the pharynx, root of tongue, epiglottis and larynx injected red. The pharynx is laid open behind, and the specimen hangs by it. Shows the relations of the base of the tongue and the larynx. Compare Nos. 17.14 and 17.15, and 21.50 and 21.51.

31. 29. The Isthmus of the Fauces and the Pharynx.

Hunterian. GG. 37.

A section has passed through the base of the skull, nose, roof of mouth, tongue and lower jaw posterior to the upper teeth, but about the second molars in the lower jaw, and the middle part of the base of the skull posterior to the plane of this, comprising most of the sphenoid and anterior part of the basi-occipital, has been removed with the pharynx and larynx. The specimen shows in front, the cavity of the nose, part of hard palate, uvula, tonsils (which are very small), base of the tongue, and posterior wall of the pharynx. Behind is seen a dissection of the superior, middle, and inferior constrictors of the pharynx; the fibrous layer of the pharynx is attached to the body of the sphenoid right across. The fibres of all three pairs of muscles intersect in the middle line, and diverge in a similar manner slanting downwards, and are attached at the sides to the hamular and pterygoid processes, root of tongue, hyoid bone and thyroid and cricoid cartilages; bristles indicating the attachment of the middle constrictors to the great cornua of the hyoid bone, delimit the extent of their several insertions.

31. 30. The Tonsils and Pharynx.

Hunterian. GG. 38.

Part of the lower jaw, lower lip, tongue and larynx finely injected red, hanging by the lip; showing above, the tonsils considerably enlarged, and a number of enlarged lymphatic glands outside the pharynx; below, the anterior bellies of the digastric, part of the mylohyoid muscles, the submaxillary gland, and a number of enlarged lymphatic glands of the submaxillary and deep cervical sets.

31.31. The Uvula and Tonsils.*Hunterian. GG. 39.*

The soft palate and uvula, with the back of the pharynx, finely injected red, hung by the anterior part of the soft palate, showing the tonsils and back of the pharynx; the uvula drawn forward between the tonsils. Compare Series 17, Nos. 8 and 9.

31.32. The Pharyngeal Tonsil.*Hunterian. GG. 44.*

Horizontal section of the nose, showing the above. It presents a curious foliated appearance, the more usual appearance being that seen in No. 8 of Series 17, Nose, which see. This specimen might have been more appropriately placed in the Nose series, but is placed here to complete the naso-oral ring of adenoid tissue formed by lymphoid follicles of the base of the tongue, the tonsils and the pharyngeal tonsil. Injected red.

*Comparative Anatomy.***31.33. The Cuticle of the Tongue. Calf. *Hunterian. II. 16g.***

A portion of the above torn from the cutis. The horny layer in some places is torn up from the rete mucosum, leaving it studded with villi; in others the villi have torn across and the rete mucosum appears perforated, demonstrating that the epithelial villi are hollow, the hollows in the natural condition being occupied by the villi of the cutis.

31.34. The Cuticle of the Tongue. Calf. *Hunterian. II. 16h.*

Another portion of the same, divided into the rete mucosum and horny layer by tearing; the villi mostly torn across, so that the deep layer appears full of holes. Many of the villi of the corium are in the cavities of the villi of the rete mucosum.

31.35. The Cuticle of the Tongue. Calf. *Hunterian. II. 16i.*

Another portion of the same, the horny layer torn from the rete mucosum, the villi of the cutis, remaining *in situ*, are seen projecting from the inner surface of the horny layer.

31. 36. The Cutis of the Tongue. Calf. *Hunterian. II. 52d.*

A portion of the tongue of a "slink calf" (new born), the cuticle removed, showing the surface vascular and raised into numerous papillae.

31. 37. The Cutis of the Tongue. Calf. *Hunterian. II. 52c.*

Similar to the preceding.

31. 38. The Tonsil of an Elephant. *Hunterian. G. 18.*

Showing it to be composed of a number of masses with rounded orifices ; these, as in the human subject, are crypts which receive the ducts of mucous glands, and are surrounded by masses of lymphoid tissue. A bristle is placed in the orifice of the pharyngeal sac, a diverticulum of the pharynx found in many animals and occasionally, *e.g.*, in horses, troublesome from the formation of concretions in it.

31. 39. The Tonsil of an Elephant. *Hunterian. G. 19.*

Similar to the preceding, the pharyngeal sac laid open, showing the orifices of numerous crypts.

SERIES 32.

INJURIES AND DISEASES OF THE TONGUE, SALIVARY GLANDS, TONSILS, AND PHARYNX.

I. CONGENITAL DEFECTS AND MALFORMATIONS, . . .	—
II. INJURIES,	—
III. CHANGES DUE TO CONDITIONS, LOCAL OR GENERAL, AFFECTING NUTRITION.	
<i>Furred Tongue</i> ,	1-2
<i>Macroglossia</i> ,	3
IV. CHANGES DUE TO INFLAMMATORY DISEASE.	
<i>Diphtheria, etc.</i> ,	4-7
V. TUMOURS.	
<i>Diverticulum of the Pharynx</i> ,	8-9
<i>Epithelioma of the Pharynx</i> ,	10-12
<i>Congenital Cystic Tumour of the Neck</i> ,	13

I. CONGENITAL DEFECTS AND MALFORMATIONS.

Specimens wanted.

II. INJURIES.

Specimens wanted.

III. CHANGES DUE TO CONDITIONS, LOCAL OR GENERAL, AFFECTING NUTRITION.

32.1. Furred Tongue.

Hunterian. GG. 33.

Part of a tongue injected red. The epithelial covering of

the villi, owing to some disease, is formed in excessive quantity or is not properly shed and accordingly accumulates, giving rise to the condition called furred tongue. In this specimen most of the fur has been scraped off showing the highly vascular papillae, so that the appearance is rather that of a tongue which is cleaning during convalescence.

32.2. Furred Tongue.

Hunterian. GG. 34.

Tongue, with larynx slit open, cleaned in the centre, but covered with fur at the edges.

32.3. Macroglossia.

Hunterian. GG. 35.

"A very large anterior portion of a tongue. It is the superfluous part of a woman's tongue, cut off by Mr. Lambert; did well with the other part." The papillae are greatly hypertrophied, and the cut surface appears to be made up of fibrous trabeculae with wide spaces between them—hypertrophy of the connective tissue with dilatation of the interstitial lymph spaces, which is the usual cause of this condition.

IV. CHANGES DUE TO INFLAMMATORY DISEASE.

32.4. Chronic Hypertrophy of the Tonsils.

Hunterian. GG. 40.

The pharynx, soft palate, and tonsils, from before; the tongue and larynx removed, showing a moderate degree of the above.

32.5. Acute Phlegmonous Ulceration of the Tonsils and Fauces. Quinsy.

Hunterian. GG. 41.

"An ulcerated tonsil, with the tongue covered with black fur, from a child who died of putrid sore throat. Dr. Hunter says it was perfectly rotten; fingers went through and through." A ragged sloughing surface extends from the left tonsil backwards into the pharynx and downwards towards the larynx, and has destroyed the left pillar of the fauces, ary-epiglottic fold and edge of the epiglottis, and ulcerated into the larynx.

32.6. Diphtheritic (?) Exudation in the Pharynx and Orifice of the Larynx.*Hunterian. GG. 41a.*

The larynx with part of the trachea and pharynx opened behind, showing the above. The exudation is mostly in the pharynx, but extends into the larynx. Formerly described as "Pharynx and oesophagus slit open; to show the coagulable lymph, forming an inflammatory crust which lines these parts, and covered also the tongue; in a child who died of thrush." Figured in Matthew Baillie's *Engravings*, Fasc. III., Pl. II., fig. 1: "The layer of white matter which lines the cavity of the pharynx and oesophagus in thrush." Probably from a case of diphtheria.

32.7. Diphtheritic (?) Exudation in the Pharynx.*Hunterian. GG. 41bb.*

The tongue, larynx, and pharynx of a woman who died of "putrid sore throat," showing a thin layer of fibrinous exudation about the pharynx and orifice of the larynx. "Case, Mrs. M. The exudation or inflammatory membrane reached the oesophagus itself." Probably from a case of diphtheria.

V. TUMOURS OF THE PHARYNX.

32.8. Pulsion Diverticulum of the Pharynx.*Hunterian. O. 43.*

The larynx and part of the pharynx and oesophagus of a man, the posterior wall of the pharynx laid open and partly removed, showing a large pouch formed from the posterior wall of the pharynx just at its junction with the oesophagus. Two quills show the passage of the oesophagus. The following account of the case is taken from *Medical Observations and Inquiries*, Vol. III., p. 85: "A Case of Obstructed Deglutition, from a Preternatural Dilatation of, and Bag formed in the Pharynx, in a letter from Mr. Ludlow, Surgeon at Bristol, to Dr. William Hunter." A gentleman, æt. 60, swallowed a cherry-stone, which lodged in his throat, and was returned three days later, a feeling of soreness remaining for a considerable time. About a year later, he noticed that an hour or two after a meal a small part of the food was returned, apparently unaltered, and without any preceding sick-

ness. The quantity of food returned gradually increased, and about five years later, all that he swallowed was returned, apparently without having reached the stomach. Bougies were always arrested about the level of the top of the thorax. On post-mortem examination, the bag was found behind the oesophagus, extending a little way into the chest, hanging quite loose, and principally situated on the right side. The oesophagus was pushed forwards, and flattened against the trachea. The bag was much more in the direct line of the pharynx than the oesophagus, and the septum between the two acted like a valve to the latter. There seems to have been some dilatation (possibly congenital) in which the cherry-stone lodged, as patient was able to swallow with little inconvenience while it was in the pharynx. Figured also by Matthew Baillie, *Engravings*, Fasc. III., Pl. I., fig. 2.

32.9. Pulsion Diverticulum of the Pharynx. —

The larynx and pharynx of an adult, the latter laid open down the left side and turned forwards, and the former split open behind showing its interior. The pharynx shows a pouching, of considerable size, of its posterior wall, the lower edge of the orifice of which is about the level of the second ring of the trachea. It is very similar to the preceding, but situated at a somewhat higher level. The wall of the pouch is very thick, and lined with mucous membrane similar to that of the pharynx, but appears to contain no muscular fibre except a band in the edges of its orifice. History not known.

32.10. Epithelioma of the Pharynx. *Hunterian. O. 45.*

The tongue, larynx, pharynx, and part of the oesophagus and trachea, the pharynx and oesophagus laid open behind, showing a ragged ulcer extending from the upper end of the cricoid cartilage to about 7 cm. below it. It appears to have extended all round the pharynx. The whole wall of the pharynx is destroyed in front, and the ends of the tracheal rings are seen in the floor of the ulcer. The thyroid gland is slightly enlarged, and there are a number of enlarged and infiltrated lymphatic glands at the side of the trachea. "It killed the patient." No further history. On microscopic examination the growth is found to be an epithelioma. (MS.

Notes, J.H.T., p. 14.) It is figured in Matthew Baillie's *Engravings*, Fasc. III., Pl. III., fig. 1.

32.11. Epithelioma of the Pharynx. *Hunterian. O. 46.*

The larynx, pharynx, and part of the oesophagus slit open behind, showing the above. The growth has extended right round the tube for about 6 cm. of the lower region of the pharynx; the wall is greatly thickened, and internally it is ulcerated. The edges of the ulcer are hard and raised. Microscopic examination shows it to be an epithelioma. (MS. Notes, J.H.T., p. 13.)

32.12. Epithelioma of the Pharynx. *Hunterian. O. 47.*

The pharynx, larynx, trachea and thyroid gland, the larynx split and the pharynx opened from before showing a large ulcer with raised ulcerated floor. It forms a mass of considerable thickness; it is situated chiefly on the posterior wall of the pharynx, but also extends right round the passage. It is very hard, and must have formed a very tight stricture. The walls of the larynx are infiltrated, but there is no appearance of the tumour within its cavity. The ulcer extends from the level of the top of the epiglottis about 6 cm. down the pharynx. Microscopic structure; epithelioma. The thyroid is enlarged; simple hypertrophy. (MS. Notes, J.H.T., p. 18.)

32.13. Congenital Cystic Tumour of the Neck.

Presented by Dr. T. K. Dalziel, 1898.

One half of a tumour, of slightly irregular oval shape, measuring 9.5 cm. by about 7 cm., which "was removed from an infant aged three weeks," by Dr. Dalziel. "The tumour was present from birth, and interfered with respiration and deglutition. It extended from the mastoid process to the clavicle, and from behind the sternomastoid to across the middle line in front. The tumour was said to have increased rapidly since birth. The infant made a good recovery, and suffered very little from shock of the operation, which lasted twelve minutes." The specimen is enclosed in a distinct fibrous capsule. It is slightly lobulated externally. In section it is seen to consist of thin-walled

cysts with mucous contents, of various sizes up to that of large peas, mixed with a considerable amount of fairly solid tissue of glandular appearance. In microscopic section it is found to consist mostly of glandular tissue of somewhat varied appearance—groups of small tubules with simple cylindrical epithelium, larger tubes lined with a rich stratified columnar epithelium, and the above-mentioned cysts, in which the epithelium is flattened by pressure. Between these epithelial structures there is a considerable but varying amount of connective tissue, in parts highly cellular like a piece of sarcoma, in other parts showing the characters of more or less fully developed connective tissue. There are also a few small nodules of cartilage and bone. The tumour may be described as a teratoma; probably connected with remains of the branchial clefts of the embryo. (W. of Scotland Clin. Res. Lab., No. 2.26.)

SERIES 33.

ANATOMY OF THE OESOPHAGUS AND STOMACH.

<i>The Oesophagus,</i>	1-2
<i>The Coats of the Stomach,</i>	3-12
<i>The Blood-vessels of the Stomach,</i>	13-22
<i>The Pylorus,</i>	23-27
<i>Comparative Anatomy,</i>	28-43
<i>The Effects of Digestion,</i>	44-46

33.1. The Oesophagus and Stomach. *Hunterian. O. 2.*

A portion of the oesophagus and stomach laid open, showing the mucous membrane lining them. "Highly injected red," but now of a dark grey colour from some alteration in the vermilion used in the injection.

33.2. The Oesophagus. *Hunterian. O. 4.*

A portion of the above inverted, showing the cuticular lining partly separated and hanging in loose shreds.

33.3. The Oesophagus, Stomach, and Duodenum. *Hunterian. O. 11.*

From a child, injected red, blown up, dried, and mounted in turpentine "to show the shape of the stomach" in the distended condition. Slight constrictions mark the cardiac and pyloric orifices.

33.4. The Peritoneal Coat of the Stomach. *Hunterian. O. 12a.*

"Peritoneum, or the external coat of all the abdominal viscera,

injected red, and exceedingly vascular." Showing the characteristic arborescent arrangement of the peritoneal vessels. Dried and mounted on blue paper.

33.5. The Muscular Coat of the Stomach.

Hunterian. O. 12.

"A stomach inverted, boiled, and dissected, to show the longitudinal and circular muscular fibres." It is hung by the pyloric end; the longitudinal fibres are best seen along the lesser curvature.

33.6. The Mucous Coat of the Stomach. *Hunterian. O. 16.*

A stomach laid open to show the internal coat thrown into rugae, "in consequence of the contraction of the muscular coat"; these disappear when the organ is distended.

33.7. The Mucous Coat of the Stomach. *Hunterian. O. 17.*

A stomach inverted. Similar to the preceding.

33.8. The Mucous Membrane of the Stomach.

Hunterian. O. 18.

A child's stomach inverted. Similar to the preceding.

33.9. The Mucous Membrane of the Stomach.

Hunterian. O. 19.

The pyloric end of the stomach inverted, showing the above.

33.10. The Mucous Coat of the Stomach. *Hunterian. O. 20.*

Similar to No. 33.7.

33.11. The Mucous Membrane of the Stomach.

Hunterian. O. 21.

A portion of the stomach cut to show its edges, "where it is evident that the rugae are in the internal coat only." Shows also the thickness of the mucous membrane.

33.12. "The Stomach in its Relaxed State."*Hunterian. O. 22*

Showing that the rugae are not permanent, as in the intestine, but disappear when the muscular coat is relaxed.

33.13. The Vascularity of the Gastric Mucous Membrane.*Hunterian. O. 23.*

A portion of the stomach of an adult injected red, showing the above. With a lens the mucous membrane can be seen to be honeycombed by the mouths of the gastric glands, which are rendered distinct by the injection of the vascular plexus around their orifices.

33.14. The Vascularity of the Gastric Mucous Membrane.*Jeffray Collection.*

A stomach, injected red and inverted; similar to the preceding. The injection seems to be extravasated at numerous points.

33.15. The Arteries of the Stomach.*Hunterian. O. 24.*

Stomach of a child injected red, inflated, dried and mounted in turpentine, showing the vessels arising along the lesser (superior) and greater (inferior) curvatures and running round the organ, the two sets anastomosing very freely. They rise from all three branches of the coeliac axis—from the gastric on the lesser, and from the splenic and hepatic arteries on the greater curvature.

33.16. The Arteries of the Stomach.*Hunterian. O. 26.*

Similar to the preceding; the veins were injected yellow, but very little of this colour now remains. They accompany the arteries. Turpentine.

33.17. The Arteries of the Stomach.*Jeffray Collection.*

Similar to the preceding. In turpentine.

33.18. The Vascularity of the Mucous Membrane of the Stomach.*Hunterian. O. 28.*

"Stomach of a child at birth, inverted and distended with spirits, both arteries and veins injected red from the umbilical

cord. Nothing can be more uniformly red, nor is there the least ruptured vessel in the whole surface." With a lens the mouths of the glands with which the mucous membrane is honeycombed can be very distinctly seen, appearing darker than the plexus of vessels between them.

33.19. The Vascularity of the Gastric Mucous Membrane.

Hunterian. O. 28a.

Stomach of a slightly older child minutely injected and inverted.

33.20. The Vascularity of the Gastric Mucous Membrane.

Hunterian. O. 29.

Stomach of a foetus minutely injected and inverted. There is a marked contrast between the mucous membrane of the stomach and that of the oesophagus. The latter appears white with a tinge of pink, being less vascular and its vessels obscured by the thick stratified epithelium with which it is lined. Shows the difference in vascularity between a richly glandular secreting mucous membrane, and one whose function is chiefly protective.

33.21. "The Stomach of a Foetus at Six Months."

Hunterian. O. 30.

Finely injected red and inverted, showing the vascularity of the gastric mucous membrane contrasted, though not so sharply as in the preceding, with that of the oesophagus.

33.22. The Vascularity of the Stomach. *Hunterian. O. 31.*

"The stomach of a foetus at six months," injected red and cut open, showing the difference in vascularity, corresponding with the difference in functional activity, between the mucous and serous coats of the stomach.

33.23. The Pylorus.

Hunterian. O. 34.

The small end of the stomach and the beginning of the duodenum distended, hardened in spirit and then laid open, showing the pyloric orifice and the pylorus in section. The pylorus consists of a fold of

the mucous membrane all round the orifice with increase of the muscular coat to a thick ring forming a sphincter.

33.24. The Pylorus.

Hunterian. O. 34a.

The lower end of the stomach and part of the duodenum distended with spirit, hardened and then opened above and below to show the pyloric orifice with its fold of mucous membrane and sphincter intact. The entrance of the common bile duct into the duodenum is also seen with a bristle passed through it. The character of the mucous membrane is very different on the two sides of the orifice, the gastric being honeycombed with glands, the duodenal covered with villi. Compare No. 33.27.

33.25. The Pyloric Orifice.

Hunterian. O. 34b.

The lesser end of the stomach, showing the above and the pylorus in section.

33.26. The Pylorus.

Hunterian. O. 35.

The lesser end of the stomach and part of the duodenum distended, hardened in spirit and laid open, showing the fold of the pylorus looking deeper and thinner than usual.

33.27. The Mucous Membrane about the Pyloric Orifice.

Hunterian. O. 35.

The lower end of the stomach and beginning of the duodenum injected red and laid open, showing the change in the character of the mucous membrane at the pylorus, that of the stomach being thicker and honeycombed with tubular glands, that of the duodenum also containing tubular glands, but of another kind, and being covered with villi. In the duodenum are seen a number of the little papillae which belong to the compound acino-tubular glands of the duodenum, called Brunner's glands. They are peculiar to the duodenum.

Comparative Anatomy of the Oesophagus and Stomach.

33.28. The Oesophagus and Cardiac Orifice of the Stomach of a Leopard (?).

Hunterian. O. 6a.

"Lower end of the oesophagus of a quadruped (leopard, I believe), with the upper orifice of the stomach." The cuticular

lining of the oesophagus appears wrinkled, not very thick, and terminates by a very distinct circular border just within the cardiac orifice, the lining membrane then assuming the thick velvety glandular character of the gastric mucous membrane.

33.29. The Oesophagus and Cardiac Orifice of the Ass.

Hunterian. O. 5.

Lined with a very thick horny cuticle fit to withstand the passage of thorny vegetable food. The thick cuticle ends in an irregular border about two inches (5 cm.) within the cardiac orifice. Contrast this with the preceding, which is the oesophagus of a carnivorous animal.

33.30. The Oesophagus of the Turtle.

Hunterian. O. 6.

A portion of the oesophagus and stomach of a turtle, showing the former studded, especially in its upper part, with strong thick villi with hard points, from 1 to 2 cm. in length and 2 to 5 mm. in diameter at their bases, the points all directed towards the stomach. They become fewer and shorter, and gradually disappear towards the stomach. "Their use is supposed to be that of preventing any animal swallowed down from getting up again, also it is evident that the turtle cannot vomit."

33.31. The Oesophagus of the Turtle.

Hunterian. O. 7.

Upper half of the above, similar to the preceding, but the villi are longer and not so hard. It is partly injected red; the injection shines through the villi at the upper end, giving them a pink tinge.

33.32. The Oesophagus of the Turtle.

Hunterian. O. 8.

Lower half of the preceding, showing the disappearance of the villi in the lower part of the oesophagus and the transition to the soft gastric mucous membrane.

33.33. The Oesophagus of the Turtle.

Hunterian. O. 8a.

Another of the same.

33.34. The Stomach of a Ruminant Animal. Goat.*Hunterian. O. 38.*

"The four stomachs of a goat inverted to show their internal surfaces: that of the first is villous; that of the second like the cells of a honeycomb; that of the third like the septa in an orange, only villous; that of the fourth is not much distant from the internal surface of the human stomach." The last is the one which secretes the true acid gastric juice. The quill marks the oesophageal orifice. Compare next specimen.

33.34a. The Stomach of a Ruminant Animal. *Hunterian.*

(Not numbered or described.) A stomach similar to the preceding, not inverted, and with part of the oesophagus remaining. The first stomach (or division of the stomach), the "rumen" or "paunch," is laid open and partly cut away. The second, the "reticulum" or "honeycomb bag," is the large unopened sac constituting the greater part of the specimen. The third, the "omasum," "psalterium," or "manyplies," is laid open from end to end, showing the septa more naturally than in the preceding specimen. Of the fourth, the "abomasum," only a portion remains.

33.35. The Glands of the Stomach of the Pigeon.*Hunterian. G. 20.*

A portion of the first or digestive stomach of the pigeon, showing a thick mucous membrane composed almost entirely of oval compound glands with round orifices set on end, in appearance somewhat like the larvae of bees in a honeycomb.

33.36. The Glands of the Stomach of the Ostrich.*Hunterian. G. 17.*

A portion of the proventriculus or digestive stomach of the above, similar to the preceding on a large scale. See next specimen.

33.37. The Glands of the Stomach of the Ostrich.*Hunterian. O. 33a.*

A portion of the proventriculus or digestive stomach of the ostrich, corresponding with the cardiac end of the human stomach.

A thick cuticle is turned down (the torn mouths of the glands hang from its deep surface), leaving bare the mucous membrane with the mouths of numerous glandular follicles. From the deep surface of this the muscular layer has been raised, showing the bases of the same glands set close together, ranging in size from a grain of wheat to a grain of maize, and distinctly lobulated.

33.38. The Glands of the Stomach of the Ostrich.

Hunterian. O. 33b.

Similar to the preceding.

33.39. The Stomach of a Chicken. Proventriculus and Gizzard.

Hunterian. O. 10.

Laid open, showing the glandular part lined with thick mucous membrane studded with glandular follicles, and the gizzard, which corresponds to the pyloric region of the mammalian stomach, with thick muscular wall lined with a strong cuticle. At the back of the specimen hangs a piece of the intestine inverted, showing the villi very long. Injected red, but the colour has degenerated to black.

33.40. Gizzard of Goose.

Hunterian. O. 13.

A transverse section of the above, showing an immensely thick (about 5 cm.) muscular wall, with a thick, almost horny, cuticular lining adapted for grinding the hard food on which the bird lives. The section also shows the pair of tendons which unite the two great masses of muscle, affording them a purchase for acting on one another like millstones.

33.41. Gizzard of a Small Bird.

Hunterian. O. 15.

Said to be from a sparrow, but looks much too large. Like the preceding on a small scale. The cavity of the organ is expanded; when opened this always contains a quantity of small stones and other hard objects which appear to serve as grinders.

33.42. Gizzard of Ostrich.

Hunterian. O. 42c.

Section of the above, showing the strong muscular walls and a very thick cuticular lining.

33.43. Stomach, Proventriculus and Gizzard, of a Large Bird.

(Source unknown. Jar marked No. 56.) The muscular coat of the first part of the proventriculus is dissected off to show the gastric glands as in Nos. 35-37. It opens into the upper part of the gizzard, and about 5 cm. from it arises the intestine also from the upper part. The two great muscular masses present externally a pair of tendinous expansions which converge at either end into a thick strong tendon which holds them together.

*The Effects of Digestion.***33.44. The Effects of Digestion on Teeth and Bone.***Hunterian. O. 41a.*

"Some teeth and other bones, with a ball of hair, found in the stomach of a leopard that died in the Tower (Tower of London). The bones are half dissolved; the teeth were as soft as a camel hair pencil, and would have answered most purposes nearly as well. The ball of hair shows the twisting of the fibres by the stomach in its peristaltic action like the vortex of a whirlpool." Compare Series 53, section Animal Hair Balls. The teeth have been decalcified by the hydrochloric acid of the gastric juice.

33.45. Post-mortem Digestion of the Stomach.*Hunterian. O. 50a.*

The stomach of the leopard from which the preceding were taken. "Parts digested by the same menstruum which was digesting the bones." Does not show much now.

33.46. Fish partly Digested, from the Stomach of a Skate.*Hunterian. O. 42a.*

"From the stomach of a skate, undergoing the same process as the bones in the leopard's stomach. No. 41a." (Now 33.44.)

SERIES 34.

INJURIES AND DISEASES OF THE OESOPHAGUS AND STOMACH.

I. CONGENITAL DEFECTS AND MALFORMATIONS. . . .	—
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III. CHANGES DUE TO CONDITIONS AFFECTING NUTRITION,	—
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<i>Inflammation of the Stomach</i> ,	11-12
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V. TUMOURS.	
<i>Non-Malignant</i> ,	15-17
<i>Malignant</i> ,	18-32

I. CONGENITAL MALFORMATIONS.

Specimens wanted.

II. INJURIES ; FOREIGN BODIES IN THE OESOPHAGUS AND STOMACH ; THE EFFECTS OF POISONS, ETC.

(a) *Foreign Bodies.*

34. 1. Half-Crown Impacted in the Oesophagus.

Hunterian. O. 42.

“A portion of the oesophagus of a person who died in a few

days in consequence of accidentally swallowing a half-crown piece; it stuck just behind the left auricle of the heart; a bleeding from the stomach destroyed him. The half-crown is seen sticking in the oesophagus, and now black from a kind of rust (Dr. Orme).” There is no ulceration of the oesophagus visible externally. Figured in Matthew Baillie’s *Engravings*, Fasc. III., Pl. I., fig. 1.

34.2. Half-Crown which was swallowed, and passed in safety through the Intestine.

Hunterian.

The specimen lies (where it was) in the calculi case. With it is a note in William Hunter’s handwriting as follows: “A half-crown of King Wm., swallowed by my footman, which he passed without any trouble within 30 hours.”

34.3. Localized Dilatation of the Stomach by Foreign Bodies.

Hunterian. O. 50.

“A portion of the stomach from a subject in the dissecting room, in which is seen a pouch formed by five halfpence sticking together; black, and seeming on their under surfaces to have been rubbed bright by the action of the stomach: their effect on the patient not known.” The specimen is a square of stomach wall about 8 cm. on the side. The upper part of this, as it hangs, is thin and soft, but appears to be whole stomach wall—perhaps softened by post-mortem digestion; the lower two-thirds is thick and firm. The middle of the square is occupied by the pouch. It is very well defined on the sides and below; above it is not so well defined. Its greatest depth is 1·5 cm. Its breadth at the top is 3·7 cm. Its edges slope down to the bottom, which is fairly flat. The sloping part of the wall of the pouch seems to consist of the whole of the stomach wall more or less stretched. At the bottom it changes its character abruptly, becoming a thin translucent membrane. The area of thin membrane is a sharply-defined circle 2·3 cm. in diameter; it is white and transparent, with the exception of a few strands of yellow tissue which look like the remains of blood-vessels. It is not at all like a pouch pushed out between the muscle fibres of the stomach. The edges of the thin area are so well defined from the part which is simply stretched, it is so cleanly

circular, and it fits sufficiently well to the halfpennies—the largest of which measures 2·7 cm., the smallest 2·6 cm.—that there can be little doubt that the manner of the formation of the pouch was, first, a bagging of a portion of the whole wall of the stomach by the weight of the coins, and later, atrophy of the area on which the lowest of them rested. The specimen is mentioned in Matthew Baillie's *Morbid Anatomy*, Ed. 1825, Vol. II., p. 133. The coins, he says, had probably been there some time, and “had produced the pouch by their weight, without causing any inflammation or ulceration.”

34.4. The Five Halfpennies from the preceding Specimen.

Hunterian.

The specimen is in the calculi case along with a note in William Hunter's handwriting, as follows: “Five halfpenny coins taken out of a dead man's stomach, where they had formed a recess or pouch by their weight.”

34.5. Perforation of the Stomach by a Foreign Body. Ostrich.

Hunterian. O. 42h.

“A portion of the ostrich's stomach with a hole with callous edges in it capable of admitting one's finger. He had swallowed a large wooden peg, which on opening the body projected an inch through the stomach. The injury seems by no means recent, and as the stomach and abdomen were not inflamed, it is doubtful whether it was the cause of death or not.” (From the original MS. catalogue, the specimen apparently having been absent in 1840, and therefore not described.) The mucous membrane is very soft and brittle, and a considerable area of it round the hole has crumbled away in the spirit.

(b) Results of Poisons.

34.6. The Stomach in Poisoning by Arsenic.

Hunterian. O. 32.

“A portion of the oesophagus and stomach from a woman who poisoned herself with arsenic; the stomach was very much inflamed.” The colour has been removed by the spirit, but the mucous membrane appears swollen, and is soft, and in some places

slightly eroded. The cuticular lining of the oesophagus is seen very distinctly ending just within the cardiac orifice.

34.7. The Stomach of a Dog "supposed to be poisoned by Arsenic."

Hunterian. O. 50d.

The stomach of a dog, inverted, showing the mucous membrane of a dark colour. The former catalogue states that "the inflammation is the most general ever seen, the whole looks black, the blood having been coagulated by distilled vinegar; there is, however, no erosion; the dog died suddenly."

(c) *Post-mortem Digestion of the Stomach.*

34.8. Post-mortem Digestion of the Stomach.

Hunterian. O. 42b.

"A portion (pyloric half) of the stomach (inverted) from a woman who died of peritoneal inflammation; the great end of the stomach was reduced almost to a jelly by the powers of the gastric juice; the digestive powers continuing so strong, shows that this disease is an inflammation, and not fever." The true nature of this condition, which is frequently met with in post-mortem examinations, especially in subjects who have died suddenly with the functions of the stomach active, was first pointed out by John Hunter in 1772, in a paper, "On the digestion of the stomach after death," published first in Vol. LXII. of *Phil. Trans.* (1773), and subsequently in the volume of *Observations on the Animal Oeconomy*, Palmer's Ed., Vol. IV., p. 116. The following is a quotation from that paper: "Animals, or parts of animals, possessed of the living principle, when taken into the stomach, are not in the least affected by the powers of the viscus so long as the animal principle remains. Hence it is that we find animals of various kinds not only can live in the stomach, but are even hatched and bred there; yet the moment that any of these lose the living principle, they become subject to the digestive powers of the stomach. If it were possible for a man's hand, for example, to be introduced into the stomach of a living animal, and kept there for some considerable time, it would be found that the dissolvent powers of the stomach would have no effect upon it; but if the same hand were separated from the

body, and introduced into the same stomach, we should then find that the stomach could immediately act upon it. Indeed, if the first were not the case, the stomach itself ought to have been made of indigestible materials; for were not the living principle capable of preserving animal substances from being acted upon by the process of digestion, the stomach itself would be digested; and accordingly we find that the stomach, which at one instant—that is, while possessed of the living principle—was capable of resisting the digestive powers which it contained, the next moment—viz. when deprived of the living principle—is itself capable of being digested, not only by the digestive powers of other stomachs, but even by the remains of that power which itself had of digesting other things. These observations lead us to account for an appearance which we often find in the stomachs of dead bodies; and they at the same time throw considerable light upon the nature of digestion. The appearance we allude to is a dissolution of the stomach at its great extremity, in consequence of which there is frequently a considerable aperture made in that viscus. The edges of this opening appear to be half dissolved, very much like that kind of solution which fleshy parts undergo when half digested in a living stomach, or when acted upon by a caustic alkali, viz. pulpy, tender, and ragged. In these cases the contents of the stomach are generally found loose in the cavity of the abdomen, about the spleen and diaphragm; and in many subjects the influence of this digestive power extends much further than through the stomach. I have often found that, after the stomach had been dissolved at the usual place, its contents let loose had come into contact with the spleen and diaphragm, had dissolved the diaphragm quite through, and had partly affected the adjacent side of the spleen, so that what had been contained in the stomach was found in the cavity of the thorax, and had even affected the lungs to a small degree. There are very few dead bodies in which the stomach at its great end is not in some degree digested; and one who is acquainted with dissections can easily trace these gradations. To be sensible of this effect nothing is more necessary than to compare the inner surface of the great end of the stomach with any other part of its inner surface; the sound portions will appear soft, spongy, and granulated, and without distinct blood-vessels, opaque and thick; while the others will appear smooth, thin, and more transparent; and the vessels will be seen ramifying in its substance, and upon squeezing the

blood which they contain from the larger branches to the smaller, it will be found to pass out at the digested ends of the vessels, and to appear like drops on the inner surface." He was led to suspect the nature of this process by observing that it was "most frequent in those who had died from sudden violence," in whom the digestive functions would be active at the time of death. This specimen is figured in Matthew Baillie's *Engravings*, Fasc. III., Pl. VII., fig. 2.

34.9. Post-mortem Digestion of the Stomach.

Hunterian. O. 42c.

A portion of the same stomach, showing a distinct boundary between the half dissolved and the sound part. This can usually be traced all round the organ, marking the level to which the gastric juice rose. The digested part is very soft and gelatinous. On blue paper.

34.10. Post-mortem Digestion of the Stomach.

Hunterian. O. 42d.

Another portion of the digested part of the same stomach, half dissolved and pulpy.

34.11. Post-mortem Digestion of the Stomach.

Hunterian. O. 50b.

"Stomach from a woman who had died the third day after labour, in a fever, who had also taken an emetic," showing a very typical example of the above condition. It has been slit open for some distance along the greater curvature, from the pyloric end, and inverted. It shows the digested area with very distinct margins, including the greater part of the fundus, appearing swollen, softened, and slightly translucent. As the history shows, the cause of death was an acute disease; the secretion of active gastric juice, therefore, continued to near the end of life.

III. CHANGES DUE TO CONDITIONS AFFECTING THE NUTRITION.

Specimens wanted.

IV. INFLAMMATORY DISEASES OF THE STOMACH.

34. 12. Inflammation of the Stomach. *Hunterian. O. 51.*

A "portion of the oesophagus and stomach of (Mr. Hume) a person who died of the gout in his stomach; there was considerable inflammation, even in some places to extravasation, as may be seen, the blood having been coagulated in the vessels and cellular membrane by means of distilled vinegar." These appearances have faded now.

34. 13. Inflammation of the Stomach. *Hunterian. O. 52.*

Another portion of the preceding.

34. 14. Simple Stricture of the Pylorus. *Hunterian. O. 50c.*

"A portion of the small end of the stomach (inverted) from a woman in the dissecting room; there is a stricture of the pylorus which barely admits a quill; there are also a great many prune-stones which were found in the stomach, and which could not pass the pylorus." There is slight thickening about the pylorus, especially about the gastric side of it, but nothing in the mucous membrane to suggest carcinoma or an old ulcer. Probably a simple fibrous stricture.

V. TUMOURS OF THE OESOPHAGUS AND STOMACH.

34. 15. Fibroma of the Stomach. Leopard.

Hunterian. O. 53a.

"A portion of the leopard's stomach," inverted; on the inside is seen a rounded tumour about the size of a walnut, very hard, "with a hole in the top passing towards its basis about half an inch, and which seemed to discharge pus." On microscopic examination it is found to be a fibroma, which has been undergoing necrosis and softening in the centre, where it is umbilicated. It is covered with mucous membrane and a layer of muscle. (MS. Notes, J.H.T., p. 26.)

34.16. Fibroma of the Stomach. Leopard.*Hunterian. O. 53b.*

Portion of a stomach, said to be part of the preceding (which is doubtful, as this is injected and the other not), showing a hard ridge which microscopic examination shows to have the structure of a fibroma covered with mucous membrane, and a thin layer of muscle, similar to the preceding. Two bristles are placed in holes leading into the tumour. (MS. Notes, J.H.T., p. 26.)

34.17. Submucous Myoma of the Stomach.*Hunterian. O. 53c.*

A portion of the pyloric end of a stomach, including the pylorus, inverted, showing a hemispherical tumour projecting from its inner surface. It is encapsuled, covered with mucous membrane, and very hard; a portion had been removed to show its appearance on section, and from this surface a slice was taken for microscopic examination. It is slightly umbilicated, probably from softening in the centre. It presents the structure of a myoma. (MS. Notes, J.H.T., p. 27.) It is figured in Matthew Baillie's *Engravings*, Fasc. III., Pl. IV., fig. 1, and described as "a circumscribed scirrhus tumour of the stomach."

34.18. Stricture of the Oesophagus opposite the Bifurcation of the Trachea. Epithelioma.*Hunterian. O. 48.*

The larynx, trachea, pharynx, and oesophagus, divided longitudinally, showing an ulcerated tumour forming a stricture of the oesophagus behind the bifurcation of the trachea. The oesophageal wall is replaced by a tumour, completely encircling the tube, for a distance of about 6 cm. The diameter of the tumour is only 2 cm. The tracheal wall appears to be involved to a slight degree externally. "The patient could swallow nothing, but was nourished for some weeks by clysters." There is no further history. Microscopic structure, epithelioma. (MS. Notes, J.H.T., p. 15.) Figured in Matthew Baillie's *Engravings*, Fasc. III., Pl. IV., fig. 1, as "a stricture in the oesophagus near the cardia."

34.19. Stricture of the Oesophagus opposite the Bifurcation of the Trachea. Epithelioma.*Hunterian. O. 49.*

The other half of the preceding.

34. 20. Stricture of the Lower End of the Oesophagus.*Hunterian. O. 44.*

"A portion of the oesophagus from a Mr. Knight; the part close to the stomach was of a hard gristly substance, so contracted at one part as just to admit a small quill, and forming a stricture of the oesophagus." Probably an epithelioma. Its nature could not be made out without destroying the specimen.

*Carcinoma of the Stomach.***34. 21. Carcinoma at the Cardiac Orifice of the Stomach.***Hunterian. O. 60.*

(Not described.) A portion of the stomach, hanging by the oesophagus, slit open, and laid out flat, showing a tumour involving the cardiac orifice. There is considerable thickening apparently in the wall of the oesophagus, and infiltration of the diaphragm, a small portion of which is preserved. There is also ulceration of the oesophagus internally, and the mucous membrane of the stomach is puckered up below the edge. There was probably a considerable degree of stricture. Microscopic examination shows that the tumour is a carcinoma of gastric origin; the internal edge of the section shows gastric glands, and the outer parts consist of muscle and fibrous tissue infiltrated here and there with areas of tumour which is composed of masses of cells, mostly so much altered that only the nuclei are visible, in a characteristic and fairly well developed fibrous stroma. (MS. Notes, J.H.T., p. 31.)

34. 22. Carcinoma of the Stomach, involving almost the Whole Organ; Stricture of the Oesophagus; Involvement of the Diaphragm. *Hunterian. O. 57.*

This specimen and the succeeding are the two portions of a stomach and lower end of oesophagus, which were the seat of a carcinoma. The oesophagus has been divided longitudinally, and the section carried along near the lesser curvature, and through the pylorus. This specimen consists of part of the oesophagus, by which it hangs, and the lower portion (fundus and great curvature) of the stomach. These are contorted and drawn together by the new growth, which has involved the whole mucous membrane with the exception of a small area of the lower part of the pyloric region.

The boundary between stomach and oesophagus is hardly recognizable. There is a general thickening and distortion, but little ulceration. The central tendon of the diaphragm adheres to the outside of the fundus. Microscopic examination shows the tumour to be carcinoma, originating from the stomach. (MS. Notes, J.H.T., p. 25.) "From a poor woman in Swallow Street: she imagined that nothing lay on her stomach for six months before her death." Compare next specimen.

34.23. Carcinoma of the Stomach, involving almost the Whole Organ. *Hunterian. O. 58.*

The upper part from the same stomach as the preceding, showing the carcinomatous growth extending from the cardiac orifice along the lesser curvature to the pylorus; the organ is thickened and drawn together. There is slight thickening of the upper edge of the pylorus. The two orifices are within about 6 cm. of one another, and the hollow of the curvature is filled up by a mass of carcinomatous lymphatic glands. The cardiac orifice appears to be patent though somewhat obstructed by the gastric tumour; the oesophagus is involved for a considerable distance. Compare preceding specimen.

34.24. Carcinoma of the Stomach. Lesser Curvature.

Hunterian. O. 55.

The greater part of a stomach, including the cardia and fundus, inverted, showing a general thickening of the wall of the stomach about the lesser curvature with some overgrowth of the mucous membrane and patches of ulceration. The edge of the tumour is not well defined, and is indicated by bristles. There are also visible a few lymphatic glands secondarily infiltrated. The mesentery was extensively involved. See Series 36, Nos. 113-114. The microscopic structure is that of a carcinoma, with a good deal of round cell infiltration around the epithelial processes. (MS. Notes, J.H.T., p. 24.) No history.

34.25. Carcinoma involving the Whole Stomach. Marked Contraction. *Hunterian. O. 54.*

"A longitudinal section through oesophagus, stomach and pylorus, from an old woman; everywhere thickened and scirrhus; the

cavity of the stomach was not greater than that of a small intestine." The inner surface of all of this half of the stomach, except a small part of the cardiac end, is considerably ulcerated, and the walls are thickened. There is a mass of secondarily infiltrated glands along the lesser curvature. Microscopic structure—carcinoma of the scirrhus type. (MS. Notes, J.H.T., p. 22.)

34. 26. Carcinoma of Lesser Curvature of the Stomach.

Hunterian. O. 59.

Part of the stomach, showing a thick irregularly rounded ulcerated tumour, with raised edges, about 5 cm. in diameter, situated in the lesser curvature of the stomach near to but not involving the pylorus; "from an old woman who had jaundice. Case unknown." On microscopic examination it is found to be a carcinoma, highly cellular, of the scirrhus type. The jaundice was probably due to secondary carcinomatous growths in the liver. Several carcinomatous lymphatic glands are seen outside the tumour. (MS. Notes, J.H.T., p. 30.)

34. 27. Carcinoma of the Fundus of the Stomach. Large Tumour.

Hunterian. O. 53.

A bulky tumour involving the whole fundus of the stomach to the left of the cardia, the orifice of the oesophagus not affected. There is enormous thickening of the viscus and narrowing of the cavity. The mass is smooth and lobulated on its outside; internally, lobulated and very much ulcerated. The end of the tumour has been sliced off, and the sound stomach to the pyloric side turned back over it, so as to show the thickness of the tumour and its abrupt greatly thickened edge. Its structure is highly cellular carcinoma of the scirrhus type, having a well developed stroma. A very unusually large tumour for a scirrhus. "From the dissecting room." (MS. Notes, J.H.T., p. 21.)

34. 28. Carcinoma of the Pylorus.

Hunterian. O. 42f.

A portion of a stomach showing a large carcinomatous ulcer with considerable thickening extending all round the pylorus. Structure—carcinoma of the scirrhus type. (MS. Notes, J.H.T., p. 63.) This specimen was purchased at the sale of Magnus Falconar's collection.

34.29. Carcinoma of the Pylorus. Stricture.*Hunterian. O. 42g.*

The pyloric end of a stomach slit open and laid flat, showing a tumour forming a mass of considerable size just within the pylorus. It extends all round, but is thickest on one side. The mucous surface appears hypertrophied and velvety, not ulcerated. Part of the duodenum is present, and shows the tumour ceasing abruptly at the edge of the pylorus. Its external extension has involved the duodenum a little further down, but does not appear inside it. Microscopic structure—a highly cellular carcinoma. (MS. Notes, J.H.T., p. 17.)

34.30. Carcinoma of the Pylorus. Sloughing.*Hunterian. O. 54a.*

“Pylorus, with a portion of the small end of the stomach become one large cancerous ulcer, ragged, thick, and bloody; from a patient at Chelsea who had perpetual vomitings and purgings.” The tumour, which has been slit open on one side, forms a bulky mass, which must have been about 8 cm. in diameter, just within the pylorus and extending about 6 cm. up the stomach. The duodenum is dilated, but otherwise unaffected by the tumour, which does not pass beyond the pylorus, though it has nearly destroyed it. On restoring the tumour to the natural position the pyloric orifice is seen to be obstructed, but not completely, the sloughing probably preventing a complete stoppage. Microscopically it is a highly cellular carcinoma, with a fairly well developed fibrous stroma. (MS. Notes, J.H.T., p. 23.) Matthew Baillie’s *Engravings*, Fasc. III., Pl. VI., fig. 3: “Cancer of the stomach or scirrhus advanced to suppuration.”

34.31. Carcinoma of the Pylorus. Ulcerating.*Hunterian. O. 56.*

The lesser end of the stomach, and part of the duodenum, slit open, showing “ulceration of the pylorus; it extends but a little way into the stomach itself, and not at all into the duodenum.” Resting on the duodenum is an enlarged secondarily affected gland. On microscopic examination it is found to be a highly cellular carcinoma. (MS. Notes, J.H.T., p. 28.) Matthew Baillie’s *Engravings*, Fasc. III., Pl. V., fig. 3: “Ulcers of the stomach.”

34.32. Carcinoma of the Pylorus. Ulcerating. Mucous Polypus of the Stomach.*Hunterian.*

Not described. The specimen consists of the pyloric end of the stomach, with a fringe of duodenum, slit open and hung with the pylorus about the middle of the jar and looking to the spectator's right. There has been a hard tumour of somewhat conical shape, smooth on the outside and ulcerated within, extending almost all round the viscus just within the pylorus, the edges of which and the duodenum are unaffected. It measures, when bent into its natural position, 11 cm. long by 3 to 7 cm. in diameter. Its edges are thick and firm. On section it presents the structure of a carcinoma of the scirrhus type. (MS. Notes, J.H.T., p. 32.) The calibre of the viscus has been considerably narrowed, and there is at the cardiac edge of the ulcer a cauliflower-like excrescence, which falls into the orifice when let alone, and was probably capable of completely obstructing it. This structure consists of greatly hypertrophied mucous membrane with very loose oedematous-looking fibrous tissue between the glands. Though it rests just at the edge of the ulcer, it is probably a mucous polypus and not connected with the cancer. Matthew Baillie's *Engravings*, Fasc. III., Pl. VII., fig. 1.

SERIES 35.

ANATOMY OF THE INTESTINES, RECTUM, AND ANUS.

<i>The Small Intestines and Mesentery,</i>	1-56
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(a) *The Small Intestines and Mesentery.*

35.1. The Intestines of a Foetus. *Hunterian. P. 3.*

“The whole of the small and great intestines with the mesentery, highly injected red, from a foetus at birth. The preparation was first steeped in spirits of wine, and is now in turpentine, where it becomes every day more transparent.” “It serves to give a general idea of intestines.”

35.2. The Small Intestines of a Foetus. *Hunterian.*

Attached by their mesentery to a glass rod, showing how the coils are packed together.

THE COATS OF THE INTESTINES.

35.3. The Peritoneal or Serous and Muscular Coats of the Intestine. *Hunterian. P. 4.*

A portion of small intestine distended with spirit, the peritoneal or serous coat turned down showing the external longitudinal muscular fibres, and these also in places dissected off to show the internal circular muscular fibres.

35.4. The Peritoneal and Muscular Coats of the Intestines.*Hunterian. P. 5.*

Similar to the preceding, showing the longitudinal fibres more clearly.

35.5. The Muscular Coat of the Intestines.*Hunterian. P. 6.*

A portion of small intestine inverted, boiled, and the mucous coat scraped off to show the circular muscular fibres.

35.6. The Muscular Coat of the Intestines.*Hunterian. P. 6a.*

A portion of small intestine distended with spirit, not boiled, showing the longitudinal and circular muscular fibres in their natural condition.

35.7. The Muscular Coat of the Intestine.*Dr. Allen Thomson's Collection.*

Two portions of small intestine prepared to show the above, the peritoneal coat stripped off both. The one shows the external longitudinal muscular fibres, which are raised at one part to show the internal circular fibres; the other shows the two layers of muscle, which have also in part been dissected away to show the deep surface of the mucous coat.

35.8. The Coats of the Intestines.*Hunterian. P. 7.*

A portion of the small intestine coarsely injected red, slit open along its free border, and dissected into three layers. It is hung by a thin transparent membrane, which is the mucous membrane separated from the submucous layer along the line of the muscularis mucosae, which seems for the most part to have come with it. This membrane shows numerous fine blood-vessels, and, here and there, opacities due to the solitary lymphatic follicles which have come away with it. The second layer, part of which is turned down to show its inner surface, part cleared of the muscular coat to show its outer surface, is the submucous tissue with some of the circular muscular fibres adhering to it. This is the layer in which the

blood-vessels, having entered from the mesentery and passed through the muscular coat without dividing, branch and run in all directions as is seen in its outer aspect; its inner aspect shows the finer ends of these vessels which pass through the muscularis mucosae into the mucous coat, and, here and there, the deep parts of lymphatic follicles which have remained with it. The third layer consists of the greater part of the muscular coat, showing two layers of fibres as in preceding preparations, and the serous coat. A beautiful specimen.

35.9. The Jejunum. The Valvulae Conniventes.

Hunterian. P. 9.

A portion of the jejunum from an adult, slit open to show the mucous coat of the intestine, thrown into transverse rugae somewhat like those of the stomach in its contracted state, but unlike them in being permanent. They are called valvulae conniventes; they serve to increase the secreting and absorbing surface of the intestines.

35.10. The Jejunum. The Valvulae Conniventes.

Hunterian. P. 10.

A portion of the upper part of the small intestine inverted, showing, as in the previous specimen, the valvulae conniventes. The valvulae and the hollows between them are covered with villi.

35.11. The Jejunum. The Valvulae Conniventes.

Hunterian. P. 11.

Similar to the preceding. In the edges of some of the rugae and between them are seen round knots, which are solitary lymphatic follicles. These are similar in structure to the cell masses of lymphatic glands.

35.12. The Ileum.

Hunterian. P. 14.

A portion of the lower part of the small intestine, inverted, showing the principal difference from the preceding, viz. that the valvulae conniventes are very small, mere traces, and at wide intervals.

35.13. The Ileum.*Hunterian. P. 15.*

A portion of the lower part of the small intestine distended with spirit. Similar to the preceding. The villi are very distinct.

35.14. The Villi of the Intestine.*Hunterian. P. 16.*

A portion of the jejunum finely injected red, and slit open, showing (1st) the vascularity of the intestinal mucous membrane, (2nd) the whole surface, hollows and ridges alike, clothed with little conical processes of the mucous membrane called villi, giving it a velvety appearance. These are very much better seen with a magnifying glass.

35.15. The Villi of the Intestine.*Hunterian. P. 7.*

A portion of the jejunum, similar to the preceding.

35.16. The Intestinal Villi.*Hunterian. P. 18.*

Portion of the jejunum inverted, one part finely injected red, the other remaining white, the injection having been kept from entering it by means of a ligature tied tightly round the intestine. It shows the villi and the high vascularity of the intestinal mucous membrane.

35.17. The Intestinal Villi.*Hunterian. P. 18a.*

A similar portion of the jejunum. The red injection has turned to a deep chocolate colour.

35.18. The Arteries of the Intestine.*Hunterian. P. 23.*

A portion of the intestine with mesentery, the arteries injected red, showing the manner in which they are distributed to the intestine. The vein was injected yellow, and the specimen is described, "exceedingly beautiful, 1777; yellow fades apace, 1778." The yellow is quite gone now. In turpentine.

35.19. The Arteries of the Intestine.*Hunterian. P. 24.*

Similar to the preceding, but varnished and mounted dry. A diffuse yellow staining remains between the red arteries. Mildewed.

35.20. The Arteries and Veins of the Intestine.

Hunterian. P. 25.

A portion of the intestine and mesentery similar to the two preceding specimens, pressed flat, and mounted in turpentine. Traces of the yellow injections remain in the veins, which are clearly traceable accompanying the arteries, usually only one vein to each, but that considerably larger than the artery.

35.21. The Arteries of the Intestine.

Hunterian. P. 27.

Three lengths of small intestine of a child, finely injected red, showing the distribution of the above. In turpentine.

35.22. The Arteries of the Intestine.

Hunterian.

Fourteen lengths of intestine finely injected red, inflated, and dried, showing the above.

35.23. The Arteries of the Intestines.

Hunterian. P. 28.

A portion of the small intestine of an adult, finely injected red, showing the distribution of the arteries, and the vascularity of the intestines. In turpentine.

35.24. The Arteries of the Intestines.

Hunterian. P. 29.

A short length of intestine similar to the preceding. In turpentine.

35.25. The Arteries of the Intestine.

Jeffray Collection. 302.

Similar to the preceding. In turpentine.

35.26. The Arteries of the Intestine.

Hunterian. P. 30.

A length of intestine of a child, injected red, inflated, dried and mounted on a roll of blue paper, and kept steady with cotton wool.

35.27. The Arteries of the Intestine.

Hunterian. P. 31.

Several lengths of small intestine of a child, very finely injected red, showing their vascularity. In turpentine.

35.28. The Arteries of the Intestine. *Hunterian. P. 32.*

A length of intestine with mesentery, of a child, injected black, distended with plaster of Paris, coiled, and mounted in turpentine. The injection is not extremely fine, and the specimen shows the course of the vessels from the mesentery and their branchings in the intestinal wall most beautifully.

35.29. The Arteries of the Intestine. *Hunterian. P. 33.*

A small portion of the same, inflated, dried, and varnished.

35.30. The Arteries of the Intestine. *Hunterian. P. 34.*

Another portion of the same, inflated, coiled, dried, and mounted in turpentine. A beautiful specimen.

35.31. The Arteries of the Intestine. *Hunterian. P. 35.*

“A portion of the jejunum from the adult human subject; the arteries injected most minutely with quicksilver. After filling them from the mesentery, a general ligature was made on the mesentery, and every set of arteries and veins tied separately just at the end (insertion into the intestine) of the mesentery, otherwise the mercury escaped by one set, as fast as it was injected by the other.”

35.32. The Arteries and Veins of the Intestine.

Hunterian. P. 36.

A portion of ileum, the veins as well as the arteries injected with mercury, showing the accompanying vein single, but much larger than the artery.

THE LYMPHATIC (ADENOID) TISSUE OF THE INTESTINAL
MUCOUS MEMBRANE.

35.33. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 37.

A portion of the intestine of a child slit open, showing the villi beautifully and minutely injected. Showing also several of the so-called agminated glands of Peyer, which are composed of a

number of nodules or follicles of round celled tissue identical with the cell masses in a lymphatic gland. They are sometimes also called "closed follicles" or "Peyer's patches." They appear much less vascular than the villi.

35.34. The Agminated Lymphatic Follicles.

Hunterian. P. 37a.

Another portion of the same, showing several large Peyer's patches.

35.35. The Agminated Lymphatic Follicles. Peyer's Patches.

Hunterian. P. 39.

A portion of the ileum, showing a Peyer's patch about 13 cm. long by 5 mm. broad, running in a straight line down the middle of the free side of the bowel (*i.e.* opposite the insertion of the mesentery) containing a great number of lymphatic follicles.

35.36. The Agminated Lymphatic Follicles of the Intestine.

Hunterian. P. 40.

Another portion of the ileum, slit open along the mesenteric attachment, showing two large patches of follicles in the usual position, *i.e.* at the free side of the bowel opposite the insertion of the mesentery. These patches are found chiefly in the ileum; in the jejunum and great intestine the follicles mostly occur singly.

35.37. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41.

A portion of ileum inverted, finely injected red, showing the above.

35.38. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41a.

This and the six following are pieces of ileum showing lymphatic patches of various shapes and sizes. The injection, which is very fine, was formerly red, but has now to a very large extent

degenerated to black, giving a general grey colour to the specimens. The patches are nearly white, showing them to be less vascular than the secreting glandular structures. See, in Series 36, under Tubercular Ulceration of Peyer's Patches. Nos. 36.67 *et seq.*

35.39. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41b.

35.40. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41c.

35.41. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41d.

35.42. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41e.

35.43. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 41f.

35.44. Peyer's Patches. The Agminated Lymphatic Follicles of the Ileum.

Hunterian. P. 42.

The mucous membrane stripped from a similar piece of bowel, stretched, showing the individual follicles of the patch.

35.45. The Solitary Lymphatic Follicles of the Jejunum.

Hunterian. P. 44.

A portion of the jejunum inverted, showing the solitary lymphatic follicles as little round nodules projecting among the villi in the hollows between the valvulae conniventes and also in their edges.

35.46. The Solitary Lymphatic Follicles. *Hunterian. P. 45.*

A portion of jejunum, formerly injected red, now degenerated to black, showing a number of the above.

35.47. The Solitary Lymphatic Follicles of the Jejunum.

Hunterian. P. 46.

A portion of jejunum finely injected red and inverted, showing a number of the above, mostly projecting from the edges of the valvulae conniventes. They are of a beautiful pink colour, not quite so deep as that of the surrounding villous or glandular surface.

35.48. The Solitary Lymphatic Follicles. *Hunterian. P. 89.*

A piece of jejunum, formerly injected red, now turned black, showing very distinctly a large number of the above. The former printed catalogue says, "the follicular appearance on the valvulae conniventes is probably from serofulous suppuration," a curious error, considering that William Hunter in his anatomy lectures describes these structures as normal, and probably of the same nature as the Peyer's patches. On microscopic examination they appeared to be nothing but the normal lymphatic follicles. (MS. Notes, J.H.T., p. 70.)

35.49. The Solitary Lymphatic Follicles. *Hunterian. P. 47.*

A portion of the intestine about the region of transition from jejunum to ileum, injected red and inverted, showing the above. The valvulae conniventes are few in number and small.

35.50. The Solitary and Agminated Lymphatic Follicles.

Hunterian. P. 48.

A similar portion of intestine, from the same position as the preceding, finely injected red, showing both of the above.

35.51. The Solitary and Agminated Lymphatic Follicles.

Hunterian. P. 48a.

Similar to the preceding; lower down in the ileum.

THE THREE REGIONS OF THE SMALL INTESTINE.

35.52. The Duodenum.

Hunterian. P. 50.

A portion of the first part of the small intestine, injected red and inverted, showing its thick villous mucous membrane; the

valvulae conniventes are numerous and large; the common orifice of the common bile duct and pancreatic duct is seen on the summit of a longitudinal ridge marked with two bristles. The mouths of Brunner's glands are not distinguishable.

35.53. The Jejunum.

Hunterian. P. 51a.

A portion of the second region of the small intestine, showing its thick mucous membrane; the valvulae conniventes large and numerous. Uninjected. Very like the duodenum.

35.54. The Ileum.

Hunterian. P. 51.

A portion of the third part of the small intestine, showing its thick villous mucous membrane, the valvulae conniventes almost totally wanting, and the presence of the agminated lymphatic follicles.

THE MESENTERY.

35.55. The Mesentery and Branches of the Mesenteric Artery.

Hunterian. P. 52.

The mesentery with part of the ileum and caput caecum of a child at birth, injected red and mounted in turpentine, showing the arterial trunk, which supplies the whole of the small and part of the large intestine, and the mode in which it branches.

35.56. The Mesentery of a Child at Birth.

Hunterian. P. 53.

The artery injected red, showing the plications of its distal margin, which give it extent and form corresponding to the length and disposition in coils of the intestine which is attached to it.

(b) *The Great Intestine.*

35.57. The Great Intestine. The Colon. *Hunterian. R. 1.*

A portion of the transverse colon "moderately distended with spirits." It shows the "sacculated appearance of the colon owing

to the three muscular longitudinal bands puckering the gut longways."

35.58. The Great Intestine. The Colon. *Hunterian. R. 2.*

A portion of the above, "the peritoneal coat removed off one side shows the muscular fibres on the sacculi; where the bands are running principally circular."

35.59. The Great Intestine. The Colon. *Hunterian. R. 8.*

A portion of the above inverted and the mucous coat removed "to show the circular muscular fibres."

35.60. The Ileo-colic Valve, Caput Caecum Coli, and Appendix Vermiformis. *Hunterian. R. 4.*

The above structures with the lower end of the ileum "distended with spirit, and when hardened a considerable portion on one side was removed to look on the entering of the ileum into the colon which is at right angles; it has the appearance of contracting and diffusing rather than of insertion into the colon; the villous coat of the ileum seems reflected back on the colon after its entrance, which is by means of a slit in the direction of, and, as it were, between the circular fibres of the colon, on the side next the sacrum."

35.61. The Caput Caecum Coli, Ileo-colic Valve, and Vermiform Appendix. *Hunterian. R. 4a.*

A similar preparation but hanging in its natural position, showing the slit-like aperture of the valve.

35.62. The Caput Caecum Coli Inverted.

Hunterian. R. 5.

To show the puckering of the mucous membrane corresponding with that of the muscular walls. There are no villi. Partly distended with spirit.

35.63. The Muscular Contraction of the Colon.*Hunterian. R. 9.*

A portion of the transverse colon "found in its state of peristaltic muscular contraction, and having little or no cavity." See next specimen.

35.64. The Muscular Contraction of the Colon.*Hunterian. R. 10.*

Another portion of the same, half of it opened to show that it can contract till there is almost no cavity.

35.65. The Muscular Contraction of the Colon.*Hunterian. R. 11.*

A similar portion of the colon, "opened to show its internal coat thrown into rugae like those of the stomach, in consequence of the contraction of the muscular coat."

35.66. Irregular Contraction of the Colon.*Hunterian. H. 13.*

"A portion of the colon arrested by death in its peristaltic motion. At two places it is seen contracted almost without cavity, and at two other parts it is seen distended to much more than thrice the size of the contracted part." It was filled with spirit and hardened. Shows the relative size of the gut in the contracted and in the relaxed condition.

35.67. The Mucous Membrane of the Colon.*Hunterian. R. 12.*

A portion of the colon somewhat contracted, injected red and laid open showing the above. It is highly vascular, irregularly rugose like that of the stomach and without villi.

35.68. The Mucous Membrane of the Colon.*Hunterian. R. 13.*

A portion of the colon, injected red, and laid open like the preceding.

35.69. The Mucous Membrane of the Colon.*Hunterian. R. 13 (?)*.

Similar to the preceding.

35.70. The Mucous Membrane of the Colon. Appendices Epiploicae.*Hunterian. R. 14.*

A portion of the colon prepared as the preceding, showing a number of solitary lymphatic follicles, and on the outside a number of masses of fat, called appendices epiploicae, hanging from its free edge.

35.71. The Appendices Epiploicae of the Colon.*Hunterian. F. 12a.*

A portion of the transverse colon, showing several of the above hanging from its edge by narrow stalks. One of them is of unusually large size.

35.72. The Blood-vessels of the Colon.*Hunterian. R. 16.*

The caput caecum and colon of a child with the vermiform appendix and part of the mesocolon, injected red, inflated, dried, and one side cut away, mounted in turpentine, showing the arrangement and distribution of the arteries.

35.73. The Lymphatic Follicles of the Ileo-colic Region.*Hunterian. R. 18.*

Lower end of the ileum and caput caecum coli, injected red, slit open showing the above. In the ileum they are exceedingly numerous, and arranged in patches extending right up to the verge of the valve. In the colon they are solitary and comparatively few in number.

35.74. The Caput Caecum Coli and Appendix Vermiformis.*Hunterian. R. 18a.*

The above with the lower end of the ileum, slit open. The ileum and colon hang back to back joined at the ileo-colic valve; the appendix, laid open, hangs from the caput caecum. The mucous

membrane of the appendix is highly glandular like that of the colon, and contains also a great number of lymphatic follicles. Compare preceding specimen.

35.75. The Solitary Lymphatic Follicles of the Colon.

Hunterian. R. 23.

A portion of the transverse colon laid open, injected red, showing the above, in considerable number.

35.76. The Solitary Lymphatic Follicles of the Colon.

Hunterian. R. 23a.

Portion of the colon from a child, highly injected red and laid open showing the above.

(c) The Rectum and Anus.

35.77. The Rectum and Anus Laid Open. *Hunterian. R. 19.*

Injected red. The mucous membrane is thick, very vascular, and contains vast numbers of lymphatic follicles. It is thrown into numerous irregular rugae by the contraction of the muscular coat. There is no sacculation of the muscular wall as in the colon.

35.78. The Rectum and Anus.

Hunterian. R. 19a.

Lower portion of the rectum and the anus, laid open, finely injected, showing the vascularity of the mucous membrane. The edges of the specimen show also the thickness of the muscular wall. The rugae in this part of the rectum are mostly longitudinal.

35.79. The Rectum and Anus of a Child. *Hunterian. R. 22.*

Finely injected red and laid open. Similar to No. 35.77.

35.80. The Mucous Membrane of the Rectum.

Hunterian. R. 20.

The internal coat of the rectum spread out on blue paper to show the lymphatic follicles. Compare No. 35.82.

35.81. The Mucous Membrane of the Rectum.*Hunterian. R. 21.*

Similar to the preceding.

35.82. The Mucous Membrane of the Rectum. The Lymphatic Follicles.*Hunterian. R. 22a.*

Rectum of an adult slit open, "hardened in alum and water," uninjected. Shows vast numbers of solitary lymphatic follicles.

*Comparative Anatomy of the Intestines.***35.83. The Small Intestine of the Dog. The Villi.***Hunterian. P. 53a.*

A small portion of the above, highly injected red, and inverted to show the villi, "which are long and wavy, small at the extremities like hairs—become a little thicker as they approach the villous coat, and then seem smaller again—so under the microscope."

35.84. The Small Intestine of the Dog. The Villi.*Hunterian. P. 53b.*

Like the preceding it was injected red, but the pigment used has degenerated, and it is now black. There are no valvulae conniventes; the villi are very long. "In this, as in the last, the arteries had for hours previously been injected with warm water, and this was begun while the animal was warm." Probably this was done to clear the blood out of the vessels and facilitate the entrance of the injection fluid.

35.85. The Small Intestine of the Goat. The Villi.*Hunterian. P. 53c.*

A portion of the above, injected red and inverted, showing the villi very distinctly. "The villi resemble more the human, and have considerable breadth, leaving a loose edge towards the cavity of the intestine, rather than a loose waving point as in the dog."

35.86. The Small Intestine of the Rabbit. The Villi.*Hunterian. P. 53e.*

A small portion of the above, injected red and inverted, showing the villi. "The villi project much, but resemble the papillae capitatae of the tongue rather than hairs, being rounded at the top, and apparently smaller as they come nearer the villous coat."

35.87. The Small Intestine of the Elephant.*Hunterian. P. 53f.*

Small portion of the above, injected red and laid flat. The mucous membrane is irregularly puckered, and covered with very short villi. "The villi very short and small, and more like hairs even than in the dog."

35.88. The Agminated Lymphatic Follicles. Small Intestine of the Dog.*Hunterian. G. 15.*

A portion of the small intestine, injected red and inverted, showing a very large cluster of the above.

35.89. The Solitary Lymphatic Follicles. Large Intestine of the Dog.*Hunterian. G. 14.*

The caput caecum, with vermiform appendix and part of ileum, injected red and laid open, showing its mucous membrane dotted with numerous solitary follicles. The appendix is very large, and is lined by a thick mucous membrane with solitary lymphatic follicles here and there.

35.90. The Solitary Lymphatic Follicles. The Caput Caecum and Ileum of the Elephant.*Hunterian. P. 53g.*

A portion of the ileum and the caput caecum, injected red and laid open, showing lymphatic follicles in a large patch in the ileum, solitary in the caput caecum. There is no distinct vermiform appendix, but the caput caecum ends in a point, which resembles the vermiform appendix as seen in the preceding specimen, which is from the dog.

35.91. The Duodenum of the Horse. The Bile and Pancreatic Ducts. *Hunterian. P. 50a.*

"The duodenum of the horse, slit open to show the entrance of the biliary and pancreatic ducts; one of the pancreatic ducts enters with the biliary duct, and both open by distinct mouths into a kind of sacculus or large follicle, which may serve for a sort of gall-bladder in this animal, who has none in the usual place; the other pancreatic duct opens about two or three inches further down than the first. Bougies are in all these ducts, and project into the sacculus or intestine."

35.92. The Ileum of the Horse. The Agminated Lymphatic Follicles. *Hunterian. G. 16.*

35.93. The Intestine of a Large Mammal, showing the Villi. *Hunterian. P. 17.*

35.94. The Small Intestine of the Sea-cow (Sirenia). The Lymphatic Follicles. *Hunterian. P. 42b.*

A small portion of the above inverted: "crowded with distinct follicles."

35.95. The Small Intestine of the Goose. *Hunterian. P. 53i.*

A small portion of the above, finely injected red and laid open. The upper portion has been isolated by a ligature, so that it is not injected. Shows the high vascularity of the mucous membrane. The villi are very distinct: "are most of them like the human; some are long and resemble those of the dog."

35.96. The Small Intestine of the Turtle.

Hunterian. P. 12a.

A small portion of the above, laid open, injected red, the injection prevented from entering the upper part by a ligature. The mucous membrane is thrown into fine longitudinal folds, which appear to take the place of villi.

35.97. The Small Intestine of the Turtle.*Hunterian. P. 12.*

Another portion of the same. The red injection in parts has degenerated to brown.

35.98. The Small Intestine of the Crocodile.*Hunterian. P. 13.*

A small portion of the above, laid open, showing the mucous membrane thrown into fine longitudinal ridges.

35.99. The Intestine of the Skate.*Hunterian. P. 53m.*

A portion of the above, with a valve, finely injected red, showing the villi.

SERIES 36.

INJURIES AND DISEASES OF THE INTESTINES AND PERITONEUM.

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I. CONGENITAL DEFECTS AND MALFORMATIONS.

36.1. Diverticulum Ilei. Meckel's. *Hunterian. P. 55.*

"A diverticulum or caecum in the jejunum of a man hanged at Tyburn." The "Diverticulum Ilei" is correctly described in Dr. Hunter's lectures; "jejunum" is therefore probably an error; the appearance of the gut indicates that the diverticulum was situated very far down in the jejunum, if not in the ileum. These diverticula occur from two to four feet from the ileo-colic valve, originating from a persistence of the vitello-intestinal duct (duct of the embryonic yolk sac). In the specimen, the two ends of bowel and their mesentery are tied together above, with the diverticulum hanging down from the free edge of the bowel. It is about 9 cm. long and 3 cm. in diameter (much the same as the bowel), and the end is constricted to a little knob, which appears to be cystic. It has no mesentery, but a cord can be traced from the mesentery across the bowel, and running down it on one side.

36.2. Diverticulum Ilei. Meckel's. *Hunterian. P. 55a.*

A portion of the intestine hanging by its mesentery, showing a diverticulum of the same nature as the preceding projecting from its side. It is about the same width as the bowel, and about as long as it is wide.

36.3. Diverticulum Ilei. Meckel's. *Hunterian. P. 56.*

A portion of the intestine distended and dried, showing a diverticulum about 5 cm. long and of varying diameter, from 4 to 12 mm., almost moniliform. It rises from the bowel beside the insertion of the mesentery, and runs obliquely from it, having at first a small mesentery of its own. Then it is free for about 3 cm. and its end is attached to the mesentery about 1.5 cm. from the intestine, forming a loop which might readily have become a cause of strangulation of a loop of bowel. It enters the intestine obliquely, and, as can be seen by looking in at the upper end of the specimen, there is a sort of valve over its orifice.

36.4. Diverticulum Ilei. Meckel's. *Hunterian. P. 57.*

A portion of the intestine from a child, showing a short diverticulum, about the same width as the intestine, rising from its side. Its orifice is oblique, and valved like the preceding.

36.5. Diverticulum Ilei. Meckel's. *Hunterian. P. 58.*

Dried. From an adult. It is about 10 cm. long and 2 cm. in diameter—rather less than the intestine, from the side of which it springs. One edge of its orifice is valve-like. The intestine just below it bends at an acute angle, apparently natural. There is a sharp edge, which stands up about 5 mm., between it and the diverticulum, making a partial septum of the bowel.

36.6. Diverticulum Ilei. Meckel's. *Hunterian. P. 59.*

A portion of the intestine from a child, injected red, inflated, coiled and dried, showing a diverticulum of the same calibre as the gut, and about 3 cm. long. It rises from the side of the intestine, and at one side of its orifice is a partial septum, similar to that seen in the preceding, but rather better developed.

36.7. Diverticulum Ilei. Meckel's. *Hunterian. P. 60.*

A piece of the intestine, inflated and dried, showing a large diverticulum about 3 cm. long, and bifid at its extremity. It rises from the side of the gut.

36.8. Diverticulum Ilei. Meckel's. *Hunterian. P. 61.*

It is about 4 cm. long, similar in diameter to the intestine, and rises from the free edge of the bowel opposite the insertion of the mesentery. Inflated and dried.

36.9. Diverticulum Ilei. Meckel's. *Hunterian. P. 62.*

From a new-born child. It is rather less in width than the intestine, and about three times as long as it is broad. It rises opposite the insertion of the mesentery.

36.10. Septum of the Intestine.*Hunterian. P. 54.*

A portion of the intestine, inflated and dried, showing "valvula connivens making a circle, and thence occasioning stricture in a portion of jejunum." There is a constriction of the intestine, beside which part of the wall of the tube has been cut out, to show that from the constriction there projects into the bowel, all round a septum like an enlarged valvula connivens: it measures 6 mm. in depth, and the passage through it is a round hole 1 cm. in diameter. The preparation is figured in Matthew Baillie's *Engravings*, Fasc. IV., Pl. VI., fig. 3, where it is described as "a part of the jejunum, in the cavity of which a membranous process had grown, from original malformation, resembling in its shape a ring or valve of the pylorus. It appears to have laid the foundation of no disease in the bowels."

36.11. Imperforate Anus; opened by Operation.*Hunterian. MM. 25.*

"A section through the pelvis of a female child; anus was wanting. Mr. Hewson and Mr. Bromfield did the operation here." There is a distinct dimple representing the anus; it was separated from the rectum by a thin septum only.

36.12. Imperforate Anus; opened by Operation.*Hunterian. R. 52.*

The rectum (with the bladder of a male child), "on which, as imperforate, Mr. Bromfield and Mr. Hewson performed the operation for imperforate rectum." There is about 8 mm. of raw surface between the soft skin of the anal dimple and the mucous membrane of the rectum. (It is lying upside down.)

36.13. Imperforate Anus. Distension of the Rectum.*Hunterian. MM. 25a.*

"The rectum and bladder of a child on which Dr. Hunter attempted the operation for the imperforated rectum." "Had the instrument gone on a little further, it would have succeeded." A narrow blind passage, corresponding to the anus, is marked by a bougie; it runs up to the blind end of the rectum, and is about 1 cm. long. The specimen does not show marks of any operation, but

perhaps it was only a trocar that was employed. It is figured in Matthew Baillie's *Engravings*, Fasc. IV., Pl. V., fig. 4, where there is no reference to any operation having been attempted.

36. 14. Imperforate Anus communicating with the Bladder.

Hunterian. MM. 24.

"The os pubis, bladder, rectum, with penis from a child, the anus wanting; rectum communicates with the bladder, and the faeces passed by the penis with the urine. (Mr. Wathen's case.)" The specimen is hung so that the penis and ossa pubis are in fairly natural position. The bladder is drawn up over the pubis. The rectum, opened in front and enormously dilated and hypertrophied, hangs down. A quill is passed from the rectum into the bladder, and another from the urethra into the rectum. In the angle between the bladder and rectum on the left side is a pouch, from which a portion of the stem of a feather is passed into the bladder. The passage from the rectum into the urethra is below this. The ureters are marked with bristles. The lateral pouch appears to be the left vesicula seminalis considerably dilated. The right vesicula seminalis cannot be found. The rectum opens in the membranous portion of the urethra. (The opening in the under side of the penis is artificial.)

Congenital Hernia.

See under Hernia, Nos. 36.16 *et seq.*

II. INJURIES OF THE INTESTINES.

Specimens wanted.

III. CHANGES DUE TO CONDITIONS AFFECTING THE NUTRITION OF THE INTESTINES, AND TO VARIOUS LOCAL CAUSES IN AND AROUND THEM, *e.g.* AMYLOID DISEASE; EMBOLISM OF MESENTERIC ARTERIES; HERNIA, ETC.

36. 15. Fibrinous Cast of the Intestine passed per Anum. Haemorrhage from the Liver. *Hunterian. Q. 20.*

This specimen was formerly catalogued as a "Worm from America (doubtful)." It is an elongated object of a pale drab

colour, not unlike a worm in appearance, measuring 17 cm. in length by 2 cm. in diameter. It is somewhat pointed at one end, broken at the other. From end to end it is marked by regular deep circular furrows and ridges. It had been cut across in two places. It is clearly not a worm, but a cast in blood-clot of the cavity of some part of the intestines; from the depth of the ridges and furrows corresponding to the valvulae conniventes, and from the history of the case, probably the duodenum. It has been identified with an illustration in *Med. Obs. and Inq.*, Vol. I., Pl. III., fig. 2.

An exceedingly curious account of it is given on pages 68 *et seq.*, of the same volume, under the title: "An Account of a Worm bred in the Liver," communicated in a letter to Dr. John Clephane by Dr. Thomas Bond, of Philadelphia, dated May 1, 1754:

"Since my last, the following remarkable case has fallen under my observation. Mrs. Holt, a widow lady in this city, was, about 18 months before her death, affected with a pain in the right side, which in the beginning was like the stinging of a bee, or the pricking of a pin. This pain daily increased, and gradually extended until it occupied a great part of the right hypochondriack region. It was at first in the side only, but after some months was felt alternately in the side and shoulder. Through the whole of her illness she had intervals of ease, these towards the latter end of her case were short, and the pain was so increased that she compared it to a bull-dog gnawing her liver. After 9 or 10 months she thought there was something alive in her side, for (to use her own expression) she said she plainly perceived a tickling and quirling in it. She rarely felt much uneasiness when in motion, particularly when on horseback, but was most distressed when lying in bed. She accidentally discovered that a quick smart blow, struck with an open hand on the affected place, gave immediate relief, and therefore often called her sister to do it. If the pain was in the side when relieved by the blow, it was usually felt next in the shoulder, and *vice versa* if in the shoulder. The same remarkable thing arose from the application of a lixivial poultice to the side for the space of two weeks, during which time the pain was altogether in the shoulder, but again returned to the side soon after that medicine was removed.

"In the place where the disorder began, which was about five inches from the spine, the ribs were gradually distorted, so as at length to form a considerable gibbosity; the teguments surrounding

this part grew sore, the right side became oedematous, and a quantity of fluid matter could plainly be felt under the intercostal muscles.

"A month before the patient's decease, the seat of the pain changed, it went in a direct line from the right to the left side, its motion was regular and slow, so that she did from time to time point out its progress; it was four days in passing over, afterwards fixed in the stomach, and was never more felt in the side, where the soreness of the teguments likewise soon abated.

"The stomach had hitherto received, retained, and digested the food tolerably well, but was now affected with an incessant heaving and nausea, unless now and then relieved by strong opiates or large draughts of spirituous liquors; there was likewise the same sensation of tickling and quirling in it that had been before perceived in the side. She had a slight cough from the beginning of the illness; but after the pain came into the stomach, this cough was violent, and she expectorated large quantities of a viscid frothy phlegm. These symptoms all vanished suddenly, and, in twenty-four hours after, she voided by stool the fore-part of an annular worm 9 inches long and an inch in diameter; and in six hours more the tail and other parts of the body, amounting in the whole to 20 inches in length. It was of a red colour, and filled with blood in the manner of a leech. After the worm left the stomach, Mrs. Holt complained that the stomach was fallen down, and seemed very empty, and she entirely lost the power of deglutition, so that she did not survive above 48 hours. Whilst the pain continued in the side she had a considerable degree of flesh and strength remaining, but languished fast after it came into the stomach.

"This unhappy gentlewoman was, for many months before her death, so fully convinced of there being something extraordinary in her case, that she insisted on having her body opened, and the nature of her disease carefully inquired into; which was accordingly done by Doctors Kearsely, senior, Shippen, Phineas Bond, and myself, in the presence of many of her friends. We found the liver enlarged and forced over to the left side, the substance of it harder than common, and in some parts actually scirrhus; the gall-bladder distended with thick black bile to the size of a goose egg, the stomach and intestines in a natural state, the liver adhering to the peritonaeum. In the external part of the liver under the distortion of the ribs was a large cavity containing near

two quarts, filled with bloody water, and a few lumps of coagulated blood; the surface of the liver within it appeared jagged and uneven as if it had been gnawed; on the side of this cavity was a chamber two inches in diameter, and in the bottom of it a passage leading into the hepatic duct; the mouth of this passage was pursed up, and appeared to have been considerably larger. On laying open the duodenum, we found the perforation of the biliary ducts into it so dilated as readily to admit the end of a common tallow candle; there was not here or in the neighbouring parts the least tinge of bile, nor did it flow easily by pressure on the gall-bladder, though we could not discover anything in the passage to obstruct it.

“From the above symptoms, and the appearances of the parts on dissection, there seems little room to doubt, that from the time of Mrs. Holt’s complaining of the pain in the right side, until it moved to the left, this horrid animal had its seat in the cavity we found in the liver; that afterwards it worked its way from thence into the stomach, and there continued till twenty-four hours before it was voided; and I think we may reasonably conjecture, that, when very small, it was taken into the stomach, and, passing over the pylorus, entered the biliary ducts, and pursued one of the branches of them as far as it could go, then formed its bed, and was nourished by sucking the blood, until the morbid state of the juices, or the nauseous applications used externally to her side made its situation improper; after which it returned through the same passages that had given it admittance.

“The fore part of this worm was thrown away before I had an opportunity of seeing it, but from the description her sister and the nurse gave of it, and the resemblance the remainder bears to that described by Mr. Paisley in the *Edinburgh Medical Essays*, they appear to be exactly of the same kind; I have, therefore, sent you the tail to supply the defect of his figure.

“I think this worm may justly be called an hepatic leech. If my memory does not deceive me, worms of considerable size have been found in most parts of the human body, and the same species usually in the same places; yet many of them remain, till it is too late, *morbi incogniti*; I think this must be for want of accuracy in observation. Animals of the same kind, and in the same situation, must produce a sameness of effects and symptoms, which might be known to the advantage of the patient and reputation of the physician. The singularity of this case

gave me great perplexity; it was at first considered as an obstruction of the liver, and deobstruents prescribed; the gentler failing, recourse was had to a ptyalism raised by the unguentum coeruleum rubbed over the part, mercurial plasters, and small doses of calomel by the mouth. Towards the end of this course, the worm was scarcely felt for some weeks. When we perceived matter under the intercostal muscles, we advised laying the parts open, but the patient would not submit to it."

The disease was probably a large hydatid of the liver.

(a) *Hernia.*

36.16. Sac of a Small Inguinal Hernia. *Hunterian. P. 70.*

"Peritoneum as it covered the abdominal muscles on the inside of Poupart's ligament, and went out to form a hernial sac, which is now seen empty and open."

36.17. Omentum, which formed the contents of the preceding Hernia. *Hunterian. P. 71.*

36.18. Sac of an Inguinal (Scrotal) Hernia.

Hunterian. P. 74.

"The peritoneum, as it formed a sac of a hernia in the groin, laid open; it is about five inches long and two wide; Poupart's ligament is seen at the upper edge on the forepart, and on the back part of the lower end is the testicle in its own tunica vaginalis; the epididymis was in a state of suppuration at the end next vas deferens."

36.19. Inguinal Hernia with Hydrocele. *Hunterian. Y. 61.*

The sac of an inguinal hernia, and the tunica vaginalis of the testicle, in which there had been a small accumulation of fluid, laid open in front, showing the relation of the hernial sac to the tunica vaginalis and testicle. In this case the lower end of the hernial sac seems to pass down a little way between the tunica vaginalis and the elements of the spermatic cord, which are visible behind.

36.20. Congenital Inguinal Hernia. *Hunterian. Y. 62a.*

"A most elegant hernia congenita, from an adult; Poupart's ligament and the lower edge of obliquus internus are preserved *in situ*." The pouch was distended with spirits till hard, and the anterior wall then removed, showing the cavity continuous with the peritoneal cavity, and the testicle lying naked in its lower posterior part; the neck of the sac, and the vas deferens which lies behind it, are marked with bristles. It shows the relations of this form of hernia to the spermatic cord and testicle very well. Compare Nos. 42.58-42.66.

36.21. Congenital Inguinal Hernia. *Hunterian. Y. 62b.*

The sac of a large specimen of the above, laid open before, showing the testicle lying naked at the bottom. (Matthew Baillie's *Engravings*, Fasc. IV., Pl. VIII., fig. 2.)

36.22. Inguinal Hernia (Scrotal). *Hunterian. Y. 63b.*

Part of the integuments and abdominal muscles, and the sac of a large inguinal hernia, which has passed far down into the scrotum. The tunica vaginalis and the sac are both laid open in front. The testicle lies below the sac. The spermatic cord is seen behind. In contrast to the preceding the tunica vaginalis is seen to be a distinct and separate closed sac below the hernial prolongation of the peritoneal cavity.

36.23. Umbilical Hernia. Omentum. *Hunterian. P. 81.*

"A navel rupture of the omentum, from a very fat woman in the dissecting room. The navel is twenty times its natural size; the omentum was not strangulated; it seems to have been of long standing, and to have given little or no uneasiness."

36.24. Diaphragmatic Hernia. Congenital.

Hunterian. MM. 22.

"A very large child at birth; a deficiency of the diaphragm," apparently the left external arch greatly enlarged, "has allowed the stomach and a portion of intestines to get into the cavity of the chest on the left side." The lungs are very small on both

sides, and crushed into the back of the chest, and the heart is displaced to the right beyond the middle line.

36.25. Diaphragmatic Hernia. Congenital.

Hunterian. MM. 23.

"A child at birth." There is a deficiency of the diaphragm, through which several coils of the intestines and part of the liver have passed into the right side of the thorax. The lower ribs and half of the sternum are preserved, and show the relations of parts. The hole in the diaphragm, as in the preceding, seems to be the outer arch, as the hernia has passed up in the fossa between the spine and posterior ribs. The liver is almost cut in two, only a flexible fibrous band uniting the two lobes, which seems to indicate that the displacement had existed from a very early period of foetal life, and the parts of the viscus in the thorax and in the abdomen had continued growing, while the constricted region remained nearly stationary. A very similar foetus is described as having been dissected by Dr. George Macaulay (colleague of Dr. Hunter in the Lying-in Hospital) and Dr. Hunter in 1754. The figure is almost identical in appearance with this specimen. (*Med. Obs. and Inq.*, Vol. II., p. 27, Pl. II. and III.)

(b) *The Complications of Hernia.*

36.26. Strangulated Hernia.

Hunterian. P. 69.

"A bubonocoele; case not known." A portion of the anterior parietes with the sac and contents of a hernia, the sac laid open. Inside are seen the omentum and two ends of bowel; outside a mass of omentum, loaded with fat and enclosing a loop of intestine. The neck of the sac is very narrow, and grips the contents very tightly. There is a fibrinous deposit on the peritoneum lining the abdominal wall, and about the neck of the sac and loop of intestine.

36.27. Strangulated Hernia. Gangrene and Rupture of the Intestine.

Hunterian. P. 72.

"A portion of ileum with its mesentery; on the lower edge of the arch the intestine is drawn out into a small bag, round

the beginning of which is a black circle. This bag was formed from hernia; the black circle is the line of strangulation; the patient died (Marybone Workhouse)." The protruded portion does not include the whole calibre of the gut. It is very much stretched. At the line of strangulation it is ruptured.

36.28. Omentum from a Strangulated Hernia.

Hunterian. P. 73.

"A portion of omentum, also marked with a black line, and strangulated with the intestine in the above case." The colour has faded, but the line of constriction is clearly visible.

36.29. Strangulated Hernia.

Hunterian. R. 64.

A portion of the abdominal wall with the sac of a hernia, which is laid open, showing a mass of omentum with a knuckle of colon in the middle. The bowel is tightly constricted, and the omentum looks gangrenous. The bowel inside the abdomen above the strangulation is considerably distended. "Herniary sac laid open to show colon protruded. (Not described in Hunterian MSS.)"

36.30. Hernia of the Caput Caecum. Strangulation, Sloughing, Recovery.

Hunterian. R. 54.

Lower end of the ileum and beginning of the colon, with a portion of the whole thickness of the abdominal parietes adhering to the latter, inflated and dried, from a patient who had recovered from strangulated hernia 31 years before. Patient had had a hernia for some years, which after severe exertion became irreducible, and "being without medical assistance, he suffered, for about a fortnight, terrible pains, with constipation, from a strangulation of the intestine." He was then operated upon, the surgeon cutting away "(as he imagined) six inches of the whole annular substance of the mortified intestine, and near half the scrotum, including, as he thought, the spermatic vessels and testicle of that side." All the faeces passed by the opening in the groin, but gradually began to pass by the anus, and in a month the wound closed, and he had no further trouble. The case was published in Vol. V. of the *Edinburgh Medical Essays*, by Mr. Cookesley, of Crediton,

the surgeon. On the death of the patient, 31 years later, an examination was made "to discover, if possible, by what means nature had perfected the cure." The end of the caecum was found adhering "to the ring of the abdominal muscles, and the ilion and colon with their natural appearances." Both testicles were in the scrotum. As the specimen shows, "the extremity of the caput caecum and the appendicula caeci vermiformis were the only parts that were wanting." The ileo-colic orifice is quite free, which accounts clearly for the favourable result. "The dissection of the body by Mr. Symons makes the case very clear, though it had appeared miraculous to Mr. Cookesley." (*Med. Obs. and Inq.*, Vol. III., p. 64, where the examination is described, and the preparation figured.)

(c) *Intussusception.*

36.31. Intussusception of the Small Intestine.

Dr. Allen Thomson's Collection.

A portion of the small intestine and mesentery of a child, showing the above. It forms a rounded mass about the size of a marble. The mesentery is seen drawn in between the opposing peritoneal surfaces. There are some flakes of fibrin on the intestine and mesentery, indicative of peritonitis.

36.32. Intussusception of the Small Intestine.

Jeffray Collection.

A portion of the intestine of a child, showing the above. It forms a firm sausage-like mass, 6 cm. long by 2.5 cm. in diameter, its lower end thinner than its upper. It is curved, with its concavity towards the mesentery, the drawing in of which is the cause of the curvature.

**36.33. Intussusception of the Small Intestines. Adult.
Dissected.**

Hunterian. P. 67.

A portion of the "jejunum" or upper part of the ileum, showing the above. "From an adult brought into the dissecting room. Case not known." It is hung upside down, as it shows better that way. One side of the receiving portion of the bowel is cut

out, showing the entering upper portion. It demonstrates very beautifully the arrangement of the layers—mucous surface to mucous surface, and peritoneum to peritoneum—and the manner in which the mesentery is drawn in, and the curved form which the mass is thereby caused to assume. Injected red by the arteries, yellow by the veins. (Figured in Matthew Baillie's *Engravings*, Fasc. IV., Pl. VI., fig. 1.)

36.34. Intussusception of the Lower End of the Ileum and the Caecum into the Colon. *Hunterian. P. 68.*

“Introsusception of the lower end of the ileum and caecum into the colon, which brought on convulsions, livid countenance, inability of stool, and killed the child (Amyat's) in 24 hours.” The specimen shows only the intussusceptum, the outer layer of colon having been removed, except a small portion by which the specimen hangs. The comparatively normal appearance of this contrasts with the crushed look of the invaginated portion. The outer layer of the intussusceptum is laid open to show the inner layer. The outer is entirely colon, wrinkled and swollen. Tracing it downwards, its apex is found to be the ileo-colic valve, with a coarse bristle passed into the ileum through it. The inner layer, consisting of ileum, is seen inside the inverted colon, its upper end turned out and floating free in the spirit. Beside it is the vermiform appendix, appearing quite natural.

36.35. Intussusception of the Ileum into the Caput Caecum.
Adult. —

The caput caecum laid open, showing a mass of ileum invaginated and projecting through the ileo-colic valve in a sausage-like mass, 12 cm. long by 3·5 cm. thick, strongly curved by the mesentery. The valve tightly embraces the beginning of the tumour. It is hung upside down, as the parts retain their position better that way. History unknown.

36.36. Slough of the Large Intestine, passed per Rectum.
From a Case, apparently, of Chronic Intus-
susception. *Hunterian. R. 44.*

“Portions of diseased colon, from a publican in Piccadilly.” The specimen consists of two portions of intestine, 10 and 13 cm.

in length respectively. The shorter is a tube of mucous membrane, with traces of the circular and of one of the longitudinal bands of muscle, and the attachment of the mesentery, the mucous membrane turned inwards. The longer is an inverted tube of gut with the mucous membrane outwards; a good deal torn. They are now tied together at the upper end, but seem to have been continuous with one another. They are so altered that it is difficult to determine exactly how much of the bowel they represent; clearly there is a great deal more than mucous membrane, probably, in the one part at least, the whole thickness. The history of the case, as obtained from William Hunter's lectures, is as follows: A publican in Piccadilly, after very severe exertion, by which he thought he hurt himself, began to be troubled with "complaints in his bowels, and fits of purging from time to time." At length, in a fit of purging attended with much pain, he passed what seemed to Dr. Hunter to be "about a foot of the whole substance of the intestine coming away" in a very putrid condition. Next day more sloughs were passed, but in a very ragged condition. Patient recovered, for the time being, but ever after was troubled with frequent "colic complaints," the pain being in the left side of the abdomen. At no time, during the whole illness, was there the least obstruction of stools. He died, as was stated in the printed catalogue, two years after, and on examination it was found "that the colon, instead of making a transverse turn from the right to the left kidney, turned down from the right kidney, obliquely across the abdomen, to the left groin or sigmoid flexure, so that it would seem that a great piece of the gut had come away, and at the sigmoid flexure the inside of the gut was diseased." (*Lectures*, MS. R.C.S.Eng., 42, c. 29, p 587.)

36.37. Slough of the Large Intestine, passed per Rectum. Case of Chronic Intussusception.

Hunterian. R. 45.

The sloughs which were passed the day after the preceding specimen, which see. It is a very ragged mass, measuring, as it hangs, about 23 cm. in length, composed of mucous membrane and other tissue. The mucous membrane is inwards, and is easily recognizable, being less altered than anything else.

36.38. Portion of the Colon from the preceding Case.
Removed post mortem two years later. Stricture
at the Sigmoid Flexure. *Hunterian. R. 43.*

It is about 20 cm. long, slit open and laid flat, and is said to be from the neighbourhood of the sigmoid flexure. The upper part is very wide, 10 cm. in circumference, but narrows like a funnel to a tight stricture measuring only 2 cm., below which it widens to 5 cm. The upper part is thickened, and near the stricture the mucous membrane is wrinkled, superficially eroded, and, in places, fissured, as if torn in opening and flattening out. Its appearance suggests that it is a cicatricial stricture following gangrene and shedding of a portion of bowel. The stricture explains the "colic complaints" described in the history under No. 36.36.

36.39. Prolapse of the Anus. *Hunterian. R. 52a.*

Lower part of the rectum and the anus, showing the above. The anus, which is surrounded by external piles, is considerably dilated, and a mass of oedematous-looking mucous membrane projects slightly through it.

IV. CHANGES DUE TO INFLAMMATORY DISEASE OF THE INTESTINES AND PERITONEUM.

(a) *Acute Peritonitis, and Fibrous Bands and Adhesions resulting therefrom.*

36.40. Peritonitis. Inflammation of the Intestines.

Hunterian. P. 84.

A piece of "inflamed jejunum" from a case of intestinal obstruction (Nos. 36.44–36.45). When fresh it was placed in "distilled vinegar," to fix the blood in the vessels. The areas where the coils of bowel were in contact appeared more hyperaemic. On the free surfaces and along the lines of contact there was a deposition of fibrin. Compare tubercular peritonitis specimens. The colour has faded now, and the specimen shows very little.

36.41. Peritonitis. Inflammation of the Intestines.*Hunterian. P. 84.*

A portion of jejunum, from the same case as the preceding.

36.42. Peritonitis. Fibrinous Exudation on the Intestine.*Hunterian. P. 86.*

"A portion of intestines still more inflamed, where great exudation had taken place, and the gut appears covered with coagulated lymph; from a boy in the dissecting room; it was put some hours into rectified spirits of wine, and is now distended with it." Illustrates the stage of glueing together of the coils of intestine by a soft fibrinous exudation.

36.43. Peritonitis. Organizing Fibrinous Exudation.*Hunterian. P. 86a.*

A portion of intestine, "from a patient who died purging," showing a thick layer of fibrin adhering to it by a layer of fibrous tissue. "Westminster Hospital."

36.44. Peritonitis. Fibrous Adhesions.*Hunterian. F. 7.*

A portion of the upper surface of the liver, bound to the diaphragm by a series of strands of new-formed fibrous tissue, which have been developed in the place of a fibrinous adhesion the result of peritonitis. "The new cellular membrane, or adhesion, is seen half an inch long and exceedingly vascular." The blood-vessels are rendered visible by injection with vermilion.

36.45. Peritonitis. The Blood-vessels of the Fibrous Adhesions.*Hunterian. F. 7a.*

Parts of a couple of coils of intestine, highly injected red, bound together by fibrous bands. A piece of blue paper passed under one of these shows up the blood-vessels in it beautifully.

36.46. Peritonitis. The Blood-vessels of the Fibrous Adhesions.*Hunterian. F. 9.*

Portions of mesentery and intestine, injected red, the latter

hanging from the former by a broad band of loose fibrous tissue, in which are seen a number of blood-vessels of considerable size. The band is about 2 cm. in length.

36.47. Peritonitis. Fibrous Adhesion between the Liver and the Diaphragm. *Hunterian. F. 10.*

A portion of liver connected with a portion of diaphragm by a fibrous adhesion about 2 cm. long. Injected red.

36.48. Peritonitis. Fibrous Band or Adhesion, which produced Strangulation of the Intestine. *Hunterian. P. 28.*

“Transverse arch of the colon, adhering at one point to the lower end of the ileum. The adhesion is about $1\frac{1}{2}$ inches (3 cm.) long and $\frac{1}{2}$ an inch (quite 2 cm.) in breadth; it is now untwisted, but was like twined cord in the dead body; it pressed on a portion of the ileum above, so as gradually to form a stricture there, which frequently occasioned colicky pains, enlarged the intestine above to twice its natural size, and at last strangulated it so as to kill.” (“From a woman in Great Windmill Street. Mr. Naylor’s patient.”) The adhesion resembles that in the two preceding specimens, being a mass of loose fibrous tissue. Unfortunately not injected. It is figured in Matthew Baillie’s *Engravings*, Fasc. IV., Pl. I., fig. 4.

36.49. Intestine Strangulated by a Fibrous Band. *Hunterian. P. 83.*

“The just mentioned strangulated portion of ileum,” showing the line of constriction and the dilated bowel above it. Inflated and dried.

36.50. Appendicitis. Perforation. Peritonitis. *Hunterian. P. 87a.*

The lower end of the ileum and the caput caecum laid open; the appendix vermiformis, hanging down, shows a small round perforation about 8 mm. from the tip. There are several flakes of fibrin on the appendix. The ileo-colic valve is “particularly large and

loose, the state in which it was found in a young lad who died of peritoneal inflammation, in whom clysters thrown up by the rectum were, in a few minutes after, vomited by the mouth; the linseed oil appearing on the matter vomited showed this." Probably the intestines were paralyzed in consequence of the peritonitis.

36.51. Ulceration of the Ileo-colic Valve.

Hunterian. R. 25b.

"From the dissecting room."

36.52. Ulceration of the Rectum. Proctitis.

Hunterian. R. 62.

Case not known. There are a number of ulcers, some of them punched out, and with overhanging edges, beginning, apparently, in the solitary lymphatic follicles. Dysenteric or tubercular.

36.53. Inflammation of the Colon.

Hunterian. R. 59a.

"A portion of colon, inverted, showing internal coat projecting much more than natural, and much inflamed. From the dissecting room." (Matthew Baillie's *Morbid Anatomy*, Fasc. IV., Pl. III., fig. 3.) No further history.

(b) Dysentery.

36.54. Colon from a Case of Dysentery. *Hunterian. R. 46.*

The bowel appears contracted, and the mucous membrane thickened, and thrown into lumps and ridges. It is not ulcerated. (Figured in Matthew Baillie's *Engravings*, Fasc. IV., Pl. III., fig. 1, where it is described as being "from a person who had been destroyed by camp dysentery.")

36.55. Colon from a Case of Dysentery. *Hunterian. R. 47.*

Another portion from the same case as the preceding. ("Dr. Woolaston.")

36.56. Colon from a Case of Dysentery.*Hunterian. R. 48.*

"A portion of colon from a dysenteric patient (Dr. Starke): the same appearance, but in a less degree than in R. No. 46." (No. 36.54.)

36.57. "Dysenteric" Ulcers of the Colon.*Hunterian. R. 46a.*

"Colon from a dysenteric patient, with large ulcers on the inner coat." Microscopic examination gave doubtful result. Probably dysenteric. (MS. Notes, J.H.T., p. 81.)

36.58. "Dysenteric" Ulceration of the Intestines.*Hunterian. R. 46e.*

"A portion of the same intestine with ulcers along the valvulae conniventes, and bristles passed through some of them. From the same patient." It is a portion of small intestine; the lesion in dysentery usually affects the large intestine principally.

36.59. "Dysenteric" Ulceration of the Large Intestine.*Hunterian. R. 46f.*

"Portion of large intestine very much ulcerated, from a dysenteric patient (dissecting room)."

36.60. Follicular Ulcers of the Colon.*Hunterian. R. 55.*

A portion of colon slit open, showing a number of minute ulcers, apparently of the solitary lymphatic follicles. Formerly described as "uncommon surfaces; remains of some disease probably."

36.61. Inflammation, with Ulceration and Sloughing of the Mucous Membrane of the Caput Caecum.*Hunterian. R. 49.*

"Diseased portions of colon, from a hypochondriac (?) patient (Mr. Dhal, painter)." Compare next specimen.

36.62. Inflammation, with Ulceration and Sloughing of the Mucous Membrane of the Colon.*Hunterian. R. 50.*

A portion of colon from the same case as the preceding. The mucous membrane in both is tremendously thickened, and is soft and sloughing—partly shed, partly hanging in shreds.

*(c) Typhoid Fever.***36.63. A Portion of the Intestine in Typhoid Fever. Swelling and Ulceration of the Lymphatic Follicles.***Hunterian. R. 27.*

A portion of small intestine showing the above. There are numerous solitary follicles, which are swollen, and some of them beginning to ulcerate in the centres, also one large ulcer, evidently in a Peyer's patch, with thick considerably raised edges, the centre ulcerating, and also showing on its surface a number of hard plates, seemingly calcareous, which were present when the specimen was made. "Case unknown." Microscopic examination shows the usual structure of typhoid ulcers. (MS. Notes, J.H.T., p. 79.) The calcareous plates are situated on the ulcer, and slightly raised above the ulcerating surface around them.

36.64. The Intestine in Typhoid Fever. Extensive Ulceration in Peyer's Patches. Calcareous Plates on the Ulcer.*Hunterian. R. 26.*

Another portion of the same intestine as the preceding, showing a large number of swollen solitary follicles, and one very large ulcer, of long oval shape, with thick overhanging edges, and irregularly excavated floor. On the surface of some of the swollen cellular masses are calcareous plates, as in the preceding. (MS. Notes, J.H.T., p. 79.)

36.65. The Intestines in Typhoid Fever. Ulceration of Peyer's Patches.*Hunterian. P. 93c.*

"Portions of lower end of ileum; ulceration beginning in the glandulae agminatae." Illustrates the above.

36.66. The Intestines in Typhoid Fever. Ulceration of Peyer's Patches.*Hunterian. P. 93d.*

Similar to the preceding.

(d) *Tuberculosis of the Intestines.*

36.67. Tubercular Ulcers of the Small Intestine.*Hunterian. P. 90.*

Piece of small intestine inverted, injected red, "from a child in the dissecting room," showing two round ulcers, with raised, ragged, overhanging edges, deeply excavated, the outer (longitudinal) muscular coat showing in the floor of the larger, which extends about half-way round the gut. They evidently begin in the Peyer's patches of lymphatic follicles, but extend far beyond them. "The injection appears at the ulcerated mouths of the arteries." Compare succeeding specimens. Microscopic examination: tubercular. (MS. Notes, J.H.T., p. 71.) Matthew Baillie's *Engravings*, Fasc. IV., Pl. II., fig. 1.

36.68. Tubercular Ulcers of the Small Intestine.*Hunterian. P. 90a.*

Another portion of the same intestine, slit open along the mesenteric attachment, showing an ulcer of similar character, but extending nearly all round the gut. It appears to have been tending to heal, and the process of cicatrization has been attended by marked contraction, producing considerable constriction of the canal. Injected red. (MS. Notes, J.H.T., p. 71.)

36.69. Tubercular Ulcers of the Small Intestines.*Hunterian. P. 90b.*

Another portion of intestine from the same case, slit open along the free edge so as to divide the ulcers and exhibit their depth and the overhanging edges. The sloughs have separated very completely. The ulcerated surface is decidedly less vascular than the surrounding mucous membrane. There are also a few subperitoneal tubercles, recognizable as white avascular spots. A portion of the lower of these ulcers was used for microscopic examination. They are clearly tubercular. (MS. Notes., J.H.T., p. 71.)

36.70. Tubercular Ulcer of the Small Intestine.

Hunterian. P. 90c.

Another portion of the same, showing a narrow ulcer extending almost all round the gut. Injected red.

36.71. Tubercular Ulcers of the Small Intestine. Fibrinous Deposit on the Peritoneum.

Hunterian. P. 90d.

Another portion of intestine from the same case, showing the peritoneum corresponding with the ulcers of a yellow colour from deposition of fibrin on it—a conservative peritonitis to prevent perforation. There is also a perforation and several dark marks resembling impending perforations, but these are adventitious, and caused by tearing of adhesions—they are at points not corresponding to ulcers.

36.72. Tubercular Ulcer of the Small Intestine. Cicatricial Contraction.

Hunterian. P. 92.

A small piece of intestine showing the above.

36.73. Tubercular Ulcers of the Lower End of the Ileum.

Hunterian. P. 93a.

Uninjected.

36.74. Tubercular Ulcers of the Small Intestines. Enlarged and Caseous Mesenteric Gland.

Hunterian. P. 94b.

There are a few caseating points to be seen in the section of the gland. The ulcer is very deep, and on the peritoneum there is a fibrous adhesion.

36.75. Tubercular Ulcer of the Jejunum. Enlargement of the Mesenteric Glands.

Hunterian. P. 98a.

A portion of intestine and mesentery illustrating the above.

36.76. Tubercular Ulceration of the Intestines. Perforation. Peritonitis.*Hunterian. P. 25.*

Not described. A portion of small intestine injected red, showing extensive and irregular ulceration with perforation at one point. There is a thick fibrinous exudation on the outside. The injection produces a marked contrast between the vascular mucous membrane and the avascular tubercular ulcer and fibrin. (MS. Notes, J.H.T., p. 66.)

36.77. Tubercular Ulceration of the Intestines. Perforation. Peritonitis.*Hunterian. P. 96.*

Two or three loops of intestine injected red, extensively affected by tubercular ulceration resulting in perforation and peritonitis. The peritonitis has produced a glueing together of the coils, and the contraction of the ulcers inside has shut off one coil, which is seen considerably distended. The injection shows the vascularity of the intestines, and the avascularity of the sloughs and tubercular growths in the ulcers. At several points on the peritoneal surface, corresponding to ulcers, there is a fibrinous exudation; this is especially noticeable in the neighbourhood of the perforations. (MS. Notes, J.H.T., p. 65.)

36.78. Tubercular Ulcers of the Jejunum. Perforation. Peritonitis.*Hunterian. P. 101.*

“Portion of the intestine: man died of fever. On opening the abdomen there was every appearance of child-bed fever, or abdominal inflammation.” (“Almack’s Servant.”) The peritoneum is covered with a fibrinous exudation. There is a small perforation in the floor of one of the ulcers.

36.79. Tubercular Ulcers of the Intestine. Perforations. Peritonitis.*Hunterian. P. 103.*

(Not described.) A long portion of the small intestine, with its mesentery, unopened, showing a number of dark patches—necroses of the peritoneum—several of which have resulted in perforation. A small portion laid open shows a typical tubercular ulcer.

36.80. Tubercular Ulcers of the Solitary Follicles of the Intestine.*Hunterian. R. 33.*

Two pieces of intestine showing the above. "The ulceration seems to begin always in a follicle, or amongst a cluster of follicles." The follicle seems to have swollen, and then broken down internally, and been discharged through a hole in the centre, leaving a cavity with thin overhanging edges of mucous membrane. They appear to be tubercular. The succeeding specimens from the same case are more typical tubercular ulcers. (MS. Notes, J.H.T., p. 97.) ("Dr. Stark.")

36.81. Tubercular Ulcers of the Intestine.*Hunterian. R. 34.*

Three pieces of intestine, showing ulceration of Peyer's patches, from the same case as the preceding.

36.82. Tubercular Ulcers of the Intestine. Fibrous Adhesions over the External Surface.*Hunterian. R. 35.*

Another portion of intestine from the same case, showing ulcers in the Peyer's patches, and a long fibrous adhesion depending from the base of an ulcer externally.

36.83. Tubercular Ulcers of the Intestine. Fibrous Adhesions on the Peritoneum.*Hunterian. R. 36.*

Similar to the preceding.

36.84. Tubercular Ulcers of the Intestine. Fibrous Adhesions of the Peritoneum.*Hunterian. R. 37.*

Similar to the preceding.

36.85. Tubercular Ulcer of the Intestine. *Hunterian. R. 38.*

Another portion of the same intestine, showing the ulceration in a Peyer's patch, and extending from it in the direction round the bowel, and giving rise to considerable constriction. As in the

other specimens from this case, the base of the ulcer externally is covered by a loose fibrous adhesion.

36.86. Tuberculosis of the Ileum, Ileo-colic Valve and Vermiform Appendix. Ulceration and Stricture of the Intestine. —

The lower end of the ileum and caput caecum laid open. An irregular ulcer, with overhanging edges and ragged floor, extends from about 3 cm. above the ileo-colic valve to about 1 cm. into the colon, the whole edge of the valve being stripped of mucous membrane and thickened. The walls of the viscera are thickened to nearly 1 cm. over an extent considerably wider than the ulceration, and involving the orifice of the appendix. They are fairly hard. There has been considerable contraction of the whole diseased area, and on restoring the shape of the bowel it appears that a very tight stricture had been produced. There is no history. Microscopic examination showed the disease to have been tubercular. (MS. Notes, J.H.T., p. 93.)

36.87. Tubercular Ulcer of the Colon. Perforation.

Hunterian. R. 39a.

“Ulceration with sloughing in the colon (dissecting room, 1778).”
See next specimen.

36.88. Tubercular Ulcer of the Colon. Perforation.

Hunterian. R. 39b.

“A part of the great intestines with a large ragged ulcer, which had destroyed a part of all the coats, whereby a communication had been formed between the cavity of the intestine and that of the abdomen. The external coat surrounding the ulcer is puckered, or thrown into small rugae from the contraction of the muscular coat, and the whole substance of the intestine is thickened.” Description taken from Matthew Baillie’s *Engravings*, Fasc. IV., Pl. II., fig. 5. From the same case as the preceding.

36.89. Tubercular Ulcers of the Colon. *Hunterian. R. 39c.*

From the same case as the preceding. The ulceration had reached the peritoneum, and there is a small perforation in the floor of the upper one.

36.90. Tubercular Ulcers of the Colon.*Hunterian. R. 39d.*

A large piece of colon from the same case, showing a number of superficial ulcers.

36.91. Tubercular Ulcers of the Colon.*Hunterian. R. 39.*

A portion of colon, injected, laid open, showing a number of ulcers with spots of injection appearing in their floor, like extravasations from eroded vessels.

36.92. Extensive Tubercular Ulcers of the Colon. Stricture.*Hunterian. R. 25.*

A portion of colon "from the dissecting room," laid open, showing two segments, about 6.5 and 4 cm. long respectively, in which the whole circumference of the wall of the gut is thickened, contracted, and internally ulcerated. The intervening segment of bowel is unaffected. The ulceration is tubercular. (MS. Notes, J.H.T., p. 95.)

36.93. "Former Ulceration of the Colon, Healed into Stricture."*Hunterian. R. 25a.*

Probably an old tubercular ulcer.

36.94. Cicatricial Stricture of the Sigmoid Flexure.*Hunterian. R. 61.*

A portion of the sigmoid flexure and the left half of the uterus, with a glass rod passed through a very short and tight stricture of the intestine. The stricture extends about 2 cm. It is fairly hard, but there is no tumour, its diameter being only 2.5 cm. When laid open it was found to be entirely cicatricial. It was sewn up again. The left broad ligament and ovary are attached to the bowel by a mass of fibrous adhesions. Below is a large broken-down lymphatic gland. Microscopic examination gave negative results, as the tissue is much degenerated. Most probably tubercular. (MS. Notes, J.H.T., p. 91.)

36.95. Healed Ulcers of the Intestine. *Hunterian. P. 97.*

A portion of small intestine, inverted and injected red, from the same subject as No. 36.77; showing flat, smooth, translucent surfaces, corresponding in size, shape, and position with Peyer's patches. The case from which they are said to have been taken was tubercular ulceration of the intestines with peritonitis, but these resemble more the cicatrices of former typhoid ulcers. The cicatrices are markedly less vascular than the surrounding mucous membrane.

36.96. Healed Ulcers of the Intestine. *Hunterian. P. 98.*

Another portion of the same intestine, inverted and distended with spirit, showing a number of similar cicatrices. Injected red.

36.97. Acute Peritonitis with Miliary Tuberculosis of the Intestines. *Hunterian. P. 37aa.*

A portion of intestines, "from a child who died of peritonitis," highly injected red, slit open, showing on the outside numerous shreds of fibrin, the result of acute peritonitis; also dotted over with a profusion of white spots about the size of mustard seeds, which microscopic examination shows to be tubercles in the subperitoneal connective tissue. The mucous membrane shows two Peyer's patches, but there is no ulceration, and there are no tubercles in it. (MS. Notes, J.H.T., p. 68.) Compare succeeding specimens.

36.98. Acute Peritonitis with Miliary Subperitoneal Tubercles. *Hunterian. P. 86b.*

A loop of intestine with mesentery, from the same case of peritonitis, the two limbs of the loop glued together by fibrinous exudation. The fine injection with vermilion shows up the exudation, and also gives a beautiful naked-eye demonstration of the avascularity of tubercular new formations. The mesentery as well as the intestine is dotted with miliary tubercles, which, in the cut edge, can be seen to be subperitoneal. They are very numerous in the angle beside the attachment of the bowel to the mesentery, and coalescing, form considerable flat masses, extending under the peritoneum, but apparently not going deeply into the bowel wall. (MS. Notes, J.H.T., p. 68.)

36.99. Acute Peritonitis with Miliary Subperitoneal Tubercles.

Hunterian. P. 86c.

Another coil of intestine from the same case as the preceding, showing the same glueing together and miliary tubercles. Figured in Matthew Baillie's *Engravings*, Fasc. IV., Pl. I., fig. 3, as an illustration of the "effects of inflammation upon the outer surface of the intestines."

V. TUMOURS OF THE INTESTINES.

(a) *Innocent Tumours.*

36.100. Submucous Lipoma of the Duodenum.

Hunterian. P. 64.

"The duodenum of a woman from the dissecting room, slit open to show a tumour the size of a cherry, opposite to the orifice of the gall duct. It contained a fluid, but what symptoms it produced in the body when alive are not known." It is oval, pedunculated, encapsuled, and covered with mucous membrane. It is very soft, and the surface of the section was covered with a layer of white debris, like adipocere. Microscopic structure that of a lipoma. To the naked eye, the place from which a portion was taken for microscopic examination, shows the loose texture of adipose tissue. Most of the fat seems to have dissolved out. (MS. Notes, J.H.T., p. 67.)

36.101. Adenoma of the Ileum.

Hunterian. P. 65.

A tumour, "not larger than an acorn, arising from the inner surface of the intestine, at the lower end of the ileum, and which was not complained of." ("Mr. Hume, Surgeon.") It is round, sessile, but with a considerably constricted base. A section shows it to be covered by mucous membrane with the usual lieberkuhnian glands, villi, and lymphatic follicles, and muscularis mucosae. The tumour tissue consists of sections of tubes lined with tall columnar epithelium, closely copying the glands. At one part the glands, and the glandular tubules of the tumour seem to be continuous through the muscularis mucosae. The appearances, both microscopical and naked eye, show conclusively that it is adenoma, not carcinoma. (MS. Notes, J.H.T., p. 64.)

36.102. Adenoma of the Intestine. Cystic.*Hunterian. R. 35a.*

"A small portion of intestine, cut open, showing a small excrescence." Appears to be of the same nature as the preceding. There is a small cyst on the top of it.

36.103. Warty Condition of the Mucous Membrane of the Rectum.*Hunterian. R. 59.*

"Portion of the rectum of a man who had stricture of the oesophagus, and had long been fed by clysters." The rugae of the mucous membrane are covered along their edges with what looks somewhat like masses of lymphatic follicles. On microscopic examination they are found to resemble warts in structure. "The appearance is very like disease, yet the patient complained not of the rectum." (MS. Notes, J.H.T., p. 90.)

36.104. Warty Condition of the Mucous Membrane of the Intestine.*Hunterian. R. 41.*

"A diseased piece of colon," showing a condition somewhat similar to the preceding, but less in degree. ("Dr. Stark.")

*(b) Carcinoma of the Intestines.***36.105. Carcinoma of the Ileum and Ileo-colic Valve.***Hunterian. P. 93b.*

The termination of the ileum, part of caput caecum and appendix, slit open, showing ulceration and thickening of about 6 cm. of the ileum, the ulceration extending up to the edge of the valve, and there ceasing. There is a mass of enlarged and secondarily infected lymphatic glands, and the colon and vermiform appendix are adherent to the outside of the tumour. Sections show the growth to be carcinoma. (MS. Notes, J.H.T., p. 72.)

36.106. Carcinoma of the Caput Caecum, and Vermiform Appendix.*Hunterian. P. 25c.*

"Ulceration and thickening of parts in the caecum and appendix caeci, which, with the lower end of the ileum, are slit open; it was

bought at Falconar's sale, and resembles dysenteric intestine much." The ileo-caecal valve is also thickened, and considerably constricted. The caecum is very much shrunk; the appendix on the other hand is greatly thickened, its lumen dilated, and its mucous membrane thickened and rugose, like that of the caecum. Sections prepared from caecum and appendix show (though the tissues are very much degenerated) the structure of a carcinoma. (MS. Notes, J.H.T., p. 75.)

36.107. Carcinoma of the Sigmoid Flexure and Rectum.

Hunterian. R. 53a.

The sigmoid flexure and rectum slit open. The whole loop of the former is thickened and in places ulcerated, and its concavity is occupied by a bulky tumour which is ulcerated internally. There is a second carcinomatous ulcer, with hard edges and depressed excavated centre, in the rectum about 5 cm. above the anus. The mucous membrane between the two also appears abnormally thick and succulent, and the bowel-wall as a whole is thickened and contorted. It is a cylinder-celled carcinoma. (MS. Notes, J.H.T., p. 85.)

36.108. Carcinoma of the Sigmoid Flexure. Stricture.

Hunterian. R. 29.

A portion of the sigmoid flexure slit open, showing a hard thick ulcer forming a ring round the bowel, about 2 cm. wide, and tightly constricting it. Quite a small tumour. Cylinder-celled carcinoma. (MS. Notes, J.H.T., p. 76.)

36.109. Carcinoma of the Sigmoid Flexure. Tight Stricture. Dilatation of the Bowel above.

Hunterian. R. 30.

A small ring-like growth, with fungating ulcerated surface projecting into the calibre of the bowel. There has been marked shrinking, so that the tumour is quite small, and looks especially so by comparison with the greatly dilated bowel above it. Cylinder-celled carcinoma. (MS. Notes, J.H.T., p. 77.)

36.110. Carcinoma of the Sigmoid Flexure.*Hunterian. R. 24.*

A very bulky tumour filling up the concavity of the loop. The bowel is opened round the convexity; its lumen is very much narrowed, and its walls thickened and ulcerated internally. Microscopically the growth appears to be a carcinoma; the tissues are very much degenerated. (MS. Notes, J.H.T., p. 96.)

36.111. Carcinoma of the Upper Part of the Rectum.*Hunterian. R. 53.*

The rectum and lower part of the intestines slit open, showing a rounded tumour situated about the top of the rectum, ulcerated internally, and forming a tight stricture. In structure it is a cylinder-celled carcinoma. (MS. Notes, J.H.T., p. 83.) Formerly described as "ulceration with stricture of the rectum. (Case, Dr. Hunter's.)"

36.112. Carcinoma of the Rectum. Infiltration of the Recto-Vaginal Septum.*Hunterian. R. 54.*

A large hard tumour forming a ring all round the rectum, and infiltrating the recto-vaginal septum. It is laid open behind showing its thickness and ulcerated internal surface. It begins about 6 cm. inside the anus, and extends from 4 to 6 cm. upwards. It is a carcinoma of the scirrhus type. (MS. Notes, J.H.T., p. 84.)

36.113. Carcinoma of the Rectum with Stricture.*Hunterian. R. 55a.*

About 7 cm. above the anus there is a hard ring stricture, slit open down one side, produced by a growth about 6 cm. in diameter, and extending up the bowel for about 6 cm. The mucous membrane is hypertrophied, and the rest of the bowel-wall generally thickened. In the middle is a sort of hour-glass constriction of the tumour, and at this point the stricture is tightest. "Lord T., above a year's standing, dreadful case." It is a carcinoma of the scirrhus type. (MS. Notes, J.H.T., p. 86. Matthew Baillie's *Engravings*, Fasc. IV., Pl. IV., fig. 1.)

36.114. Carcinoma of the Rectum involving the Neck of the Bladder.*Hunterian. R. 56.*

The specimen consists of the rectum and part of the bladder, and its appearance is rather spoilt by the former having been split open behind and straightened, in which the bowel has been torn at the upper edge of the ulcer. The tumour appears internally as a ragged ulcer, with very prominent hard edges forming a ring right round the bowel. It is firmly adherent to the neck of the bladder, but does not appear in it. It begins about 7 cm. within the anus, and extends about 5 cm. up into the sigmoid flexure; it presents the structure of a cylinder-celled carcinoma. (MS. Notes, J.H.T., p. 88.) "Came on with tenesmus: continued two years and killed the patient, not with very great pain, but teasing as it were: towards the end he became leucophlegmatic (general dropsy), and had water in chest and abdomen; used cicuta in vain. (Case, Mr. Cruikshank's patient Faulkner.)"

36.115. Carcinoma of the Rectum. Tight Stricture with Dilatation of the Bowel above it.*Hunterian. R. 58.*

The tumour, which has not been divided, is small and dense, extending round the bowel, and narrowing it as a whole very considerably; a quill passed through the stricture is tightly gripped. The dilated bowel above is kept open by a quill, with formerly a ring of copper wire, but this was reduced to a mass of green salt, and has been removed; it has stained the specimen green. Structure: cylinder-celled carcinoma. (MS. Notes, J.H.T., p. 89. Matthew Baillie's *Engravings*, Fasc. IV., Pl. IV., fig. 2.)

36.116. Carcinoma of the Rectum. Perforations into Vagina and Cavity of Pelvis.*Hunterian. R. 51a.*

"The rectum of the woman who had the foetus in her ovary, exceedingly ulcerated; two fistulous openings from vagina into rectum are seen; two orifices are also seen leading from the rectum into the cavity of the pelvis, so that faeces either passed or would soon have passed that way." A large ulcer of the rectum, beginning about 2 cm. within the anus, extends up it all round

for fully 9 cm. on its anterior, 6 cm. on its posterior aspect. It is laid open from behind; the cut surface is of considerable thickness, the tumour having extended widely beyond the bowel wall. It is a highly cellular carcinoma. (MS. Notes, J.H.T., p. 92.)

36.117. Carcinoma of the Rectum. Infiltration of Recto-Vaginal Septum.

Hunterian. CC. 59b.

"An uterus about the size of the impregnated at two months, diseased apparently; rectum is laid open behind, and is evidently cancerous." The wall of the rectum all round is thickened, and ulcerated internally in patches for a length of about 4 cm. There was probably a degree of stricture. The uterus itself appears to be quite free from the tumour, but the recto-vaginal septum is extensively infiltrated. Microscopically it is a highly cellular carcinoma, not cylinder celled. (MS. Notes, J.H.T., p. 120.)

36.118. Carcinomatous Infiltration of the Mesentery and Mesenteric Glands, secondary to a Tumour of the Stomach.

Hunterian. P. 99.

A loop of bowel with mesentery, injected red. The mesentery is greatly thickened. It is chiefly the glands that are affected, but the other tissues appear also more or less infiltrated. The bowel appears thickened—probably just oedematous. Microscopic examination shows masses of epithelial cells infiltrating the mesentery in every direction, but somewhat obscured by the amount of inflammatory round-cell infiltration around them, as in the primary tumour (0.55, now 34.24). (MS. Notes, J.H.T., p. 73.)

36.119. Carcinomatous Infiltration of the Mesentery and Mesenteric Glands, secondary to a Tumour of the Stomach.

Hunterian. P. 100.

A loop of bowel with mesentery from the same case as the preceding and similar to it.

*Comparative Pathology Specimen.***36. 120. Faecal Fistula in a Trout, secondary to a Wound of the Abdominal Wall.**

Presented by Alfred Brown, Esq., April, 1896.

A trout, *Salmo Fario*, female, from Loch Lomond, partially dissected, illustrating the above. There is a knuckle of intestine adherent to the margin of wound on left side, in front of ventral fin; bristle passed into duodenal section. Rectum contracted, walls thick, cavity filled with mucus, upper end caecal; anal orifice almost obliterated; intestine between rectum and wound atrophied.

SERIES 37.

ANATOMY OF THE LIVER AND PANCREAS.

<i>The Liver,</i>	1-9
<i>The Gall Bladder and Bile Ducts,</i>	10-15
<i>The Pancreas,</i>	16-19
<i>Comparative Anatomy Specimens,</i>	20-23

37.1. The Liver of a Child at Birth. *Hunterian. U. 1*

Highly injected red ; suspended by the vena cava, so as to exhibit the upper, convex, and the under, concave, surfaces, and its lobulation and shape. On the upper surface is seen the falciform ligament, and the notch of the fissure for the umbilical vein, marking the boundary of the right and left lobes. On the under surface appears, about the middle, the portal fissure running transversely to the body, with the vessels entering it. The fissure for the umbilical vein passes from the anterior edge of the liver to the left end of the portal fissure, and is continued as the fissure for the ductus venosus back to the vena cava, the two together forming the longitudinal fissure. The fissure of the gall bladder, with the bladder lying contracted in it, runs forward from the right end of the portal fissure. The area between the last and the longitudinal fissure is called lobus quadratus. The small posterior surface looks upwards and backwards ; it shows the vena cava with the lobulus Spigelii between it and the fissure for the ductus venosus, and the lobus caudatus at its lower edge, running outwards to the right lobe.

37.2. The Liver and Gall Bladder of a Child.

Hunterian. U. 1a.

Injected red, and the peritoneum stripped off.

37.3. The Coverings of the Liver—the Peritoneum and Proper Areolar Coat. *Hunterian. U. 3.*

A portion of liver, showing the above turned down at one place and floating in the spirit.

37.4. The Coverings of the Liver—the Peritoneum and Proper Areolar Coat. *Hunterian. U. 4.*

Similar to the preceding, but more distinct.

37.5. The Blood-vessels of the Coverings of the Liver. *Hunterian. U. 5.*

“The liver of a foetus about six months”; the arteries injected blue, showing the above.

37.6. The Vascularity of the Liver. *Hunterian. U. 6.*

“A portion of the liver of a child injected red; it looks like a lump of vermilion from its vascularity; one set of vessels only was injected, viz., the vena portarum system, but, from the branches of the vena cava perhaps, the pori biliari and even the branches of the arteries are injected.” Compare No. 37.8.

37.7. The Vascularity of the Liver. *Hunterian. U. 7.*

“A portion of the liver of a child injected red; redder if possible than the former.”

37.8. The Portal Venous System of the Liver.

Hunterian. U. 6.

“A portion of the liver from a child some years after birth, in which, the ductus venosus being impervious, probably only the branches of the portal vein are injected.” The vermilion being unable to pass the capillaries, the peripheral parts of the lobules are alone injected, forming a red network, enclosing round uninjected areas, which are the areas of the capillary plexus of the hepatic veins. Contrast next specimen.

37.9. The Hepatic Venous System of the Liver.*Hunterian. G. 29.*

(Not described.) A portion of liver showing a number of large hepatic veins of characteristic appearance, like open channels, being so intimately related to the cellular tissue that they do not collapse when empty. Also the central areas of the lobules are seen injected red by the hepatic vein, and the portal areas uninjected—the opposite of the preceding specimen.

37.10. The Gall Bladder.*Hunterian. U. 24.*

Distended and hardened in spirit, then cut open, and one side turned down, showing its pyriform shape, and honeycombed mucous membrane.

37.11. The Gall Bladder.*Hunterian. U. 25.*

Half of the above, showing the rugose, honeycomb-like appearance of the mucous membrane, and the ridges about the beginning of the cystic duct, forming a sort of spiral valve.

37.12. The Gall Bladder.*Hunterian. U. 26.*

Inverted and distended, showing the mucous membrane.

37.13. The Gall Bladder of “a Child.”*Hunterian. U. 27.*

Injected red and inverted. Exceedingly vascular.

37.14. The Gall Bladder of “a Young Foetus.”*Hunterian. U. 28.*

Injected red, inverted and cut open; the mucous membrane highly vascular.

37.15. The Gall Bladder and the Cystic, Hepatic, and Common Bile Ducts.*Hunterian. U. 29.*

Dissection of the above, with a portion of the duodenum, slit open and mounted on black paper.

*The Pancreas.***37.16. The Pancreas.***Hunterian. W. 1.*

Dissected out, and mounted so as to show the long flattened tail portion, and thick head. To the latter is still attached the portion of the duodenum, into which the duct opens by a common orifice with the bile duct. A bristle is passed into the pancreatic duct, and another through the common bile duct, from this orifice.

37.17. The Pancreas macerated to show its Lobulation.*Hunterian. W. 2.***37.18. The Pancreatic Ducts.***Hunterian. W. 3.*

A pancreas, the ducts of Wirsung injected red and dissected. A long duct runs the whole length of the tail, and a short one from the lower part of the head joins it near their termination in the duodenum.

37.19. Pancreas Injected with Mercury. *Hunterian. W. 5.*

In turpentine. The lower part only of the pancreas. Not transparent.

*Comparative Anatomy Specimens.***37.20. The Pancreatic Ducts. Cat.***Hunterian. W. 7.*

Pancreas of cat, the duct and its branches finely injected with mercury, and mounted in turpentine.

37.21. The Bile Duct and Duodenum of an Elephant.*Hunterian. U. 32.*

"A portion of the duodenum and gall ducts in the elephant, to show its size and entrance into the intestine; this animal has no gall bladder." The duodenum at the point of entrance of the duct is thrown into deep recesses, which may serve for storage of the bile.

37.22. The Pancreatic Duct of an Elephant.*Hunterian. W. 8.*

“Slit open on each side, the lower extremity sewed together ; it makes a tube as large as the inferior cava of a man ; the fluid it contained in the dead animal was not unlike bile, and gelatinous.”

37.23. The Pancreas of the Codfish.*Hunterian. W. 9.*

The pancreas, portion of the stomach, duodenum, and gall bladder of a cod, injected red. The pancreas is composed of a large number of thick tubules, which hang together by loose areolar tissue. They open into the duodenum, which is laid open, by five ducts marked by single bristles. A number of parasitic nematodes are visible in the loose areolar tissue.

SERIES 38.

INJURIES AND DISEASES OF THE LIVER, GALL BLADDER AND BILE DUCTS, AND OF THE PANCREAS.

I. CONGENITAL DEFECTS AND MALFORMATIONS.

Congenital Absence of the Gall Bladder, 1

II. INJURIES, —

III. CHANGES DUE TO CONDITIONS AFFECTING THE NUTRI- TION, INCLUDING CHANGES CONNECTED WITH CALCULI.

Biliary Calculi, 2-12

Pancreatic Calculi, 13

IV. CHANGES DUE TO INFLAMMATORY DISEASE.

Abscess of the Liver, 14-19

Cirrhosis of the Liver, 20-24

V. TUMOURS.

Carcinoma of the Liver and Bile Ducts, 25-26

I. CONGENITAL DEFECTS AND MALFORMATIONS.

38.1. Congenital Absence of the Gall Bladder.

Hunterian. U. 33.

“A portion of the liver of a child at birth, with the gall duct and beginning of the duodenum, injected red, to show that there was no gall bladder.”

II. INJURIES OF THE LIVER, GALL BLADDER, AND PANCREAS.

Specimens wanted.

III. CHANGES DUE TO CONDITIONS AFFECTING THE NUTRITION,
INCLUDING CHANGES CONNECTED WITH CALCULI.**38.2. A Gall Bladder completely Filled with Gall Stones.**

Hunterian. U. 61.

This specimen is figured in Matthew Baillie's *Engravings*, Fasc. V., Pl. VI., fig. 3. It consists of a portion of the liver, the gall bladder, and part of the cystic, hepatic, and common bile ducts. It is described as follows: "The gall-bladder filled with gall-stones. Little openings have been made in it, in order to bring some of the gall-stones into view. They are very numerous, and have a number of smooth sides, produced by friction, by which they become adapted in their shape to each other. The gall-bladder is a little thickened in its coats, partly from pressure, and probably also in part from unusual exertion of its contractile power." The stones are of the pearly facettèd variety, like those of the next specimen and Nos. 52.32 and 52.33.

38.3. Facettèd Gall Stones. From one Case.

Hunterian. U. 50.

"One thousand and seventy-four gall-stones of different sizes, forming thirteen rows, each of about ten inches long, spread on white paper: the smallest form three circular planes at the bottom; they are gummed to the paper, and were taken from a patient who died of a flooding, and had no jaundice." This specimen was engraved with a view to publication in a work on "calculi" which William Hunter was preparing. The set of twenty-one plates, with printed proofs, is preserved in the Museum. This specimen forms the subject of Plate II. The following history and description were also found: "One thousand and seventy-one concretions, taken from the gall-bladder of a young lady who died of a flooding in labour, 1765. She had complained, but not much, of pain in her stomach. Seven were large (one of them cut through). They were of all possible sizes, to the size of a pin's head, and all

formed upon one another into a number of flat surfaces. The smaller were perfectly similar to the larger and had the same appearance internally, and the same number of strata and of colours, so that it might be supposed that they were all formed at the same time. They were all, externally, of a fine dark-green colour, and sank in water even when dry. The large figure is the section magnified (the outline showing the real size). In the centre is an irregular cavity, round which are the pyramidal crystals, then the radiated yellow crystallization, very yellow in the middle, and lighter at the circumference, then a circle of green, then of light yellow alternately and green. Each of these with a glass was composed of many finer laminae, and the whole made of radiated lines and crystals." They are now of a yellowish colour. They belong to the pearly faceted variety of gall stones, and consist of a centre of bilirubin calcium mixed with cholesterine crystals, surrounded by a shell of dense pure cholesterine in fine laminae. Compare Nos. 52.32 and 52.33.

38.4. Black Gall Stones. From one Case.

Hunterian. U. 50a.

"A very considerable number of black gall stones, from one gall bladder." They are of very irregular shapes and sizes, and not faceted like those of the previous specimen. Typical bilirubin calcium calculi. Compare Nos. 52.44 *et seq.*

38.5. Large Solitary Gall Stone.

Hunterian. U. 49.

A gall stone nearly as large as a hen's egg, and nearly filling the gall bladder, one side of which is removed to show it. Apparently a common gall stone like Nos. 52.35 to 52.43.

38.6. Solitary Gall Stone. Contraction of the Gall Bladder.

Hunterian. U. 51.

"A gall bladder thickened, and contracted close upon a stone about the size of a cherry, and of a brown colour." One side of the bladder has been removed to show the stone. (Matthew Baillie's *Engravings*, Fasc. V., Pl. VI., fig. 2.)

38.7. Impacted Gall Stone.*Hunterian. P. 66.*

"The duodenum slit open to show a gall stone an inch long and half an inch in diameter in the very orifice of the duct, so that the person must have died in a fit of the colic" (Hunterian Plate, extra, fig. 6).

38.8. Impacted Gall Stone.*Hunterian. U. 49a.*

The gall bladder, bile ducts, and part of the duodenum mounted on black paper, showing a gall stone "about the size of a hazel nut," impacted in the common bile duct about 1.5 cm. from its opening into the duodenum. The wall of the duodenum has been dissected to show the stone. A bristle passed through the orifice of the duct shows the obliquity of its passage through the intestinal wall. The bile ducts are all "very much distended." There are two more stones in the cystic duct. This specimen is figured, omitting the gall bladder, in Matthew Baillie's *Engravings*, Fasc. V., Pl. VI., fig. 4.

38.9. Gall Stone Impacted in the Common Bile Duct.*Hunterian. U. 58.*

"A gall stone in the ductus communis choledochus, which is slit open to show that." The specimen is referred to in the description of CC.57c (now 45.48) as follows:—"From a woman in Charles Street, whose cystic duct is described as ulcerated from a gall stone as large as a walnut, and falling into the abdomen (*vide* No. 58 U)." The calculus is a common gall stone like that in No. 38.5; it is firmly gripped by the duct, and must have completely obstructed it.

38.10. Gall Stone Impacted in the Cystic Duct.*Hunterian. U. 52a.*

A gall bladder laid open showing a rough white calculus of irregularly rounded shape, about 1 cm. in diameter, impacted in the beginning of the cystic duct. "The muscular fibres uncommonly strong and fasciculated,"—seen inside the bladder.

38.11. Obstruction of the Cystic Duct by Calculi. Contraction of the Gall Bladder.*Hunterian. U. 51a.*

The gall bladder, bile ducts, and part of the duodenum, in which the common bile duct and hepatic ducts are quite pervious, and

appear slightly dilated, and the cystic duct obstructed at its commencement by a number of small facettèd gall stones. The gall bladder is contracted to little more than the thickness of a pencil, and contains numerous minute calculi.

38.12. Ulceration of the Gall Bladder by Calculi. Perforation. Effusion of Bile into the Peritoneum.

Hunterian. U. 47g.

Part of the gall bladder "of a gentlewoman who died in Portman Square; the gall stones ulcerated their way through the bladder, and the bile was poured out into the peritoneum." The mucous membrane is deeply eroded in several places, and there is one small perforation. The gall stones are absent.

38.13. Pancreatic Calculi.

Hunterian. W. 10.

Pancreas with part of the duodenum, laid open, showing the organ converted into a loculated cyst containing numerous irregular white concretions. The secreting structures of the gland appear to be quite destroyed, and the organ is considerably below the natural size. It was found by John Hunter at a post-mortem examination. (Figured in Matthew Baillie's *Engravings*, Fasc. V., Pl. VII., fig. 2.)

IV. CHANGES DUE TO INFLAMMATORY DISEASE.

38.14. Large Abscess of the Liver.

Hunterian. U. 47.

The specimen consists of the wall of a very large "cyst," occupying the whole upper and back part of the liver. It is inverted to show the lining, which has the appearance of granulations. The unaffected part of the liver, comprising a strip of about 10 by 6 cm. of the anterior edge, and a thin layer of under surface, is seen doubled up within the inverted cyst. The diaphragm adheres over nearly the whole surface of the cyst, in intimate connection with its thick fibrous wall. Microscopic examination showed the structure of an abscess wall. (MS. Notes, J.H.T., p. 98.)

38.15. Old Dried-in Abscess of the Liver. Calcareous Infiltration.*Hunterian. U. 47a.*

One of three "cysts from the liver of a patient who died in the London Hospital: they were full of serophulous matter." One of them, now absent, is described as having contained "purer pus." They are rather larger than walnuts; their walls are of dense fibrous tissue, infiltrated with lime salts, and lined with irregular flakes and masses of fibrinous and calcareous debris. They might be old hydatid cysts, but microscopic examination gave negative result, no trace of hooklets or chitinous cyst wall being discovered.

38.16. Old Dried-in Abscess of the Liver. Calcareous Infiltration.*Hunterian. U. 47b.*

Another cyst from the same case as the preceding. Similar, but rather smaller.

38.17. Perihepatitis, secondary to Abscess.*Hunterian. U. 47d.*

A portion of the muscle and central tendon of the diaphragm, its abdominal surface covered with a layer of fibrinous exudation; from the same case as the preceding. Some black pigment on the pleural surface seems to point to pleuritic adhesions also.

38.18. Perihepatitis, secondary to Abscess.*Hunterian. U. 47e.*

Another portion of diaphragm from the same case. There is a fibrinous deposit on both sides of the diaphragm; that on the abdominal side appears thicker and firmer, as if partly organized.

38.19. Perihepatitis, secondary to Abscess. Fibrinous Exudation on the Pleura.*Hunterian. N. 47f.*

Portions of the liver and diaphragm from the same case, glued together by fibrinous exudation. As in the preceding specimen the pleural surface is also thickly coated with fibrin. (Matthew Baillie's *Engravings*, Fasc. V., Pl. I., fig. 1.)

38.20. Cirrhosis of the Liver.*Hunterian. U. 36.*

A small portion of the liver showing the above. The condition is advanced, and the outer surface shows very typically the "hobnailed" appearance, and the cut surface the bands of new-formed fibrous tissue between the lobules. "From a highly jaundiced subject"—the jaundice probably resulting from a superadded attack of acute hepatitis or catarrh of the bile ducts.

38.21. Cirrhosis of the Liver.*Hunterian. U. 37.*

Another slice of the same liver showing the same condition, but less distinctly.

38.22. Cirrhosis of the Liver.*Hunterian. U. 38.*

Another portion of the liver, said to be from the same case as No. 38.20. The outer surface is less nodulated, and the fibrous septa are less pronounced in the cut surface, but on the whole the condition is the same.

38.23. Cirrhosis of the Liver.*Hunterian. U. 38a.*

"A portion of Mr. K——'s liver, who died dropsical; it cut like cartilage, and was white and tuberculated. The absorbents (lymphatics) on its surface very large; one of these, almost the size of a goose quill, is seen full of mercury. He drank hard and had been very strong; was also a few months before in full vigour as a man." The condition is very similar to the preceding. Mounted in turpentine.

38.24. Cirrhosis of the Liver.*Jeffray Collection.*

A large slice from a highly cirrhotic liver showing very well the hobnailed surface, and in section the new-formed fibrous tissue.

V. TUMOURS.

*(a) Tumours of the Liver and Gall Bladder.***38.25. Primary Colloid Carcinoma of the Bile Ducts.
Extension through the Abdominal Wall.***Hunterian. P. 102.*

The specimen, of which unfortunately there is no description in the old catalogue, consists of a large portion of the liver,

including the portal fissure and part of the gall bladder, and two portions of small intestine which are laid open. The greater part of the mass consists of a tumour imbedded in the liver. It appears in two of the cut surfaces, and is seen to consist of a somewhat translucent tissue in the meshes of a fibrous stroma, with cysts here and there. It has fairly distinct fibrous margins. The posterior coil of intestine, consisting of the pylorus and duodenum, is tucked up against the tumour, which has perforated the latter, and presents inside it a small ulcerated surface. The stomach and pylorus adhere to the tumour, but are in other respects quite normal. The common bile duct enters the duodenum about 3 cm. below the ulcer on the opposite side, it is quite intact; a bristle is passed through its oblique orifice. The rest of the duct and the cystic duct are slit open, and are seen to be intact; another bristle, however, placed in the hepatic duct, passes directly into one of the opened cysts of the tumour. Openings from that into other cysts could not be found, nor could the duct be traced any further. The tumour extends forwards, involving the abdominal wall, and has infiltrated it through and through, and appears externally as two round prominent carcinomatous ulcers, each about 3 cm. in diameter. In one of the cut surfaces of the abdominal wall is seen a mass of tumour, similar in character to that in the liver, and with several cysts. A second coil of intestine is drawn up against the liver and abdominal wall, and the growth has also eaten into it. Microscopic examination shows the tumour to be a colloid carcinoma, and from its relations to the hepatic duct it probably originated in the bile ducts. (MS. Notes, J.H.T., p. 74.)

38. 26. Secondary Carcinomata of the Liver. —

A portion of tissue very highly injected red, containing a number of round nodules of tissue which are almost free from injection. Microscopic examination shows it to be liver containing carcinomata, doubtless secondary, and connected most probably with a tumour of the stomach or intestines. The tumours appear strikingly avascular by contrast with the highly injected liver tissue. Nothing known of the specimen.

(b) *Tumours of the Pancreas.*

Specimens wanted.

SERIES 39.

INTERNAL PARASITES.

<i>Tapeworms,</i>	1-12
<i>Hydatid Cysts,</i>	13-24
<i>Trichina Spiralis,</i>	25
<i>Round Worms,</i>	25-29
<i>Guinea Worms,</i>	30-31
<i>Parasitic Psorosperms of Fish,</i>	32-33

(a) *Cestoda* ; *Tapeworms*.

39.1. *Taenia Mediocanellata* or *Saginata*. *Hunterian*. Q. 16.

A fine large specimen of the above tapeworm, but without the head. The ripe proglottides very narrow. The scolex, called bladder worm or cysticercus bovis, inhabits the tissues of oxen. Probably the commonest tapeworm in this country.

39.2. *Taenia Saginata* or *Mediocanellata*. *Hunterian*. Q. 13a.

Several short lengths of the above tapeworm. They are very thin and transparent, so that the branched uterus can readily be made out in some of the proglottides. Head absent.

39.3. *Taenia Saginata* or *Mediocanellata*. *Hunterian*. Q. —.

A short length of the above showing the branched uterus very well. It is the distal portion ; many of the segments are nearly ripe, and distended with eggs.

39. 4. Taenia Saginata or Mediocanellata. —

A specimen of the above tapeworm, without the head, showing the proglottides in all states of contraction, some very short and broad, others nearly 2 cm. long and only 3-4 mm. broad. Illustrates the powers of movement possessed by the animal.

39. 5. Taenia Saginata or Mediocanellata. *Hunterian. Q. 17.*

Similar to the preceding. Head absent.

39. 6. Taenia Solium.*Hunterian. Q. 11.*

A considerable length, probably of the above worm. The head is absent, and the proglottides are rather opaque. Its scolex form, called bladder worm or cysticercus cellulosae, inhabits the pig. It occurs about as frequently as the preceding species.

39. 7. Taenia Solium.*Hunterian. Q. 15.*

A considerable length of tapeworm, probably the above worm. The head absent.

39. 8. Taenia Solium.*Hunterian. Q. 18.*

A short length of tapeworm, probably the above. Head absent.

39. 9. Taenia Solium.*Hunterian. Q. 12.*

A considerable length of tapeworm, probably the above. Head absent.

39. 10. Taenia Solium.*Hunterian. Q. 14.*

A considerable length of tapeworm, probably the above. Head wanting.

39. 11. Bothriocephalus Latus.*Hunterian. Q. 8.*

A considerable length of a tapeworm, with very broad short proglottides; the head absent. Probably the above. Its scolex form inhabits the flesh of certain fish, especially the pike. It is rare in this country, but common in Sweden, Russia, Switzerland, and Japan.

39.12. Bothriocephalus Latus.*Hunterian. Q. 9.*

Another specimen, probably of the same tapeworm. Head absent.

(b) *Taenia Echinococcus.*

39.13. Hydatid of the Liver. Taenia Echinococcus.*Hunterian. U. 45.*

This parasite is the scolex form of the tapeworm called taenia echinococcus, the adult form (strobilus) of which is a very insignificant worm, about $\frac{1}{8}$ of an inch in length, inhabiting the dog. It is found in all known lands, and is very common in Iceland and Australia. The scolex in the form of hydatids has been found in nearly all the organs of the body, but is most common in the liver. The specimen consists of a thick fibrous capsule, which envelops the parasite; one side of it is cut out, exposing a translucent bladder, which is the proper outer cyst (ectocyst) of the animal—the stratified chitinous envelope of the parasite. Within this lies the growing endocyst, from which develop the brood capsules, in which the echinococcus heads grow.

39.14. Hydatid of the Liver.*Hunterian. U. 45a.*

A smaller specimen of the same parasite, the fibrous capsule cut open, showing inside the collapsed remains of the animal.

39.15. Hydatid of the Liver.*Hunterian. U. 46.*

Another specimen of the same parasite, the fibrous capsule cut open, showing, as is often the case, several hydatid cysts. These have fallen out, and lie on the bottom of the jar. The fibrous cyst appears to be lined with an irregular layer of fibrin. Each hydatid cyst appears to contain a number of daughter cysts. (Matthew Baillie's *Engravings*, Fasc. V., Pl. V., fig. 1.)

39.16. Hydatid of the Liver.*Hunterian. U. 60.*

A large, thick-walled fibrous cyst, laid open, and a very transparent hydatid, about the size of a hen's egg, lying on the bottom of the jar.

39.17. The Wall of a Hydatid of the Liver.*Hunterian. U. 48.*

A portion of the fibrous capsule of the cyst, with the gall bladder, laid open, adhering to its outside. Also a portion of the hydatid. The chitinous capsule is about 1 mm. thick, and quite opaque. It is curled at its edges, but held out by glass rods, showing the inner surface covered with shreds of thin transparent chitinous cuticle, like shreds of mica. Apparently part of a very large old cyst, to judge by the dense fibrous appearance and thinness of the capsule and the thickness of the chitinous ectocyst.

39.18. Hydatid of the Liver.*Hunterian. U. 65.*

The chitinous ectocyst of a hydatid of considerable size. The laminated chitinous material was readily recognizable with the microscope. It is of varying thickness and opacity. There are numerous white spots in it, which are not heads. Neither echinococcus heads nor hooklets could be found in the specimen.

39.19. Hydatid of the Liver.*Hunterian. U. 64.*

The fibrous capsule laid open, and mounted in turpentine.

39.20. Hydatids from the Liver.*Hunterian. U. 39.*

Three hydatids more or less collapsed.

39.21. Daughter Cysts of a Hydatid. From the Liver.*Hunterian. U. 42a.*

A jar containing a large number of the above, varying in size from a currant to a gooseberry. Some of the larger ones appear to contain several smaller cysts.

39.22. Hydatid of the Lung.

A portion of a lung, with a fibrous walled cavity about the size of a hen's egg in it, and the hydatid which it contained hanging beside it.

39. 23. Hydatids of Bone.*Hunterian. LL. 48.*

The lower end of a femur, riddled with hydatids. There is a large cavity, the extent of which cannot be determined, as it has been divided with the saw above. At this point it occupied the whole medullary cavity. Below, the cancellated end has been scooped out, chiefly in the inner condyle, into an irregular space, from which the loose hydatids have been removed, but numbers are still to be seen sticking to its walls. The shell of bone has been eroded through in three places. The articular cartilage has also been pierced in front, and about the middle of the lower surface, and the joint totally destroyed, no trace of the cartilage now remaining. The rest of the head of the bone is riddled with small cysts, which can be seen every here and there projecting from it. The loose cysts are placed in a bottle behind the bone. There is no large cyst with the characteristic chitinous wall, but the daughter cysts are scattered independently through the cancellous bone, a form of hydatid called "exogenous," in contradistinction to the ordinary form where there is one large cyst in which the numerous daughter cysts are enclosed.

39. 24. Hydatid Cyst between the Bladder and the Rectum, causing Retention of Urine.*Hunterian.*

This specimen was neither numbered nor described in the old catalogue, but it has been identified with a specimen described in *Med. Obs. and Inq.*, Vol. VI., p. 91, under the title, "An Encysted Watery Tumour, adhering to the posterior part of the Bladder, and the whole length of the Rectum, which brought on a fatal Suppression of Urine." By Thomas Gery Cullum, surgeon, St. Edmund's Bury, Suffolk. A footnote to the paper states that "the preparation of the parts concerned in the subject of this paper is now deposited in Dr. Hunter's most valuable and magnificent museum." The following is an account of the case and specimen taken from the original paper: "I was desired to visit Simon Wicks (a lad about eighteen years of age), on Thursday evening, July 25, 1776. He acquainted me that he had not voided a drop of urine since the preceding Monday. I found him with a quick pulse, inclination to vomit, abdomen very tense and painful to the touch, and the bladder seemingly distended two inches above the navel. I examined with my fingers up the anus (which was much dilated), and found, as I imagined, the bladder so much

distended that I thought I could, with as much ease as I could open a vein with a lancet in bleeding, have punctured the bladder through the rectum, and evacuated its whole contents. I tried to pass up the urethra different sized catheters, but I found it impossible to get any of them farther than the prostate gland." The bladder was then tapped above the pubis, and "three pints of high-coloured urine tinged with blood" removed. The patient was much relieved, yet the tumour in the abdomen was still very considerable, and reached above the navel, and that which was felt in the rectum not perceptibly diminished. A cannula was kept in the bladder. About a fortnight later suppuration set in around the wound, and he died on July 25th (apparently of septicaemia). "Upon opening the body the first appearance was the omentum almost wasted away, but upon it there were several large irregular encysted tumours, each as large as a hen's egg, filled partly with a serous fluid and partly with a gelatinous substance. On removing the omentum a large body (nearly as big as a quart bottle without the neck) presented itself, very much distended with a fluid, not connected with anything at top, or at its anterior part, for some inches; but backwards, strongly adhering to all the parts contained in the pelvis, and nearly filling the whole cavity of it. Two or three inches below the navel the bladder came to view on the fore-part of this preternatural body, quite collapsed, containing not above two or three large spoonfuls of urine. I now took notice that, upon my dissecting away the parietes of the abdomen, the urine issued out from the puncture I had made into the bladder, in the first operation, which had been healed externally some considerable time.

"The kidneys were double their natural size, and in the pelvis of the right was nearly a spoonful of matter. The ureters were very little larger than natural, and except a little tumour, about the size of a goose's egg, on the convex surface of the right lobe of the liver, of the same sort as before taken notice of on the omentum, I observed nothing particular.

"This disease, from the account I could get, had been of six years' standing; it had, for certain, been of more than a year, as he was obliged, about that time, to apply to a gentleman of the faculty, who relieved him by bleeding and some laxative physic."

"The cyst of the tumour was capable of holding a full quart

wine measure. The external coat of the cyst was membranous, with some appearance of muscular fibres; the internal coat was strong and ligamentous, very much like that of steatomatous tumours. The fluid, which was as thin as water or serum and not coagulable by heat, contained in this cyst, was enclosed, if I may so express it, in a cyst of its own; I mean by that, that the coagulable part of the lymph had formed a complete cyst of a semi-transparent gelatinous substance in some places, and white and opaque in others, but firm enough to have been taken out entire." The case was considered to be one of hydatids; to judge by the description of the cyst contents it was so. Microscopic investigation gave no positive information. (MS. Notes, J.H.T., p. 160.)

Nematoda; Round Worms.

39.25. Trichina Spiralis. In Human Muscle. —

A thin slice of a human long muscle, mounted on mica, showing the above. History unknown. The white oval ticks are the parasites.

39.26. Ascaris Lumbricoides. *Hunterian. Q. 3.*

The round worm which commonly inhabits the small intestines.

39.27. Ascaris Lumbricoides. *Hunterian. Q. 4.*

39.28. Ascaris Lumbricoides. *Hunterian. Q. 5.*

"From a child who had no symptoms of worms."

39.29. Ascaris Lumbricoides. *Hunterian. Q. 6.*

39.30. Filaria Medinensis. Guinea Worm. Female.

Hunterian. II. 46.

"The guinea worm; more than 2 feet long and $\frac{1}{16}$ of an inch in diameter, rather smaller at one end than the other, but ending in a fine point either way." It is doubled and hung with the loop down one side of the jar, and the head and tail down the other. This worm inhabits the connective tissues of the body.

39. 31. Filaria Medinensis (?) Encysted beside the Testicle.*Hunterian. Y. 66.*

"A testicle, epididymis, and spermatic cord, with the tunica vaginalis dissected off. From the vas deferens hangs a tumour, with a worm in it like the vena medinensis or guinea worm." There are numerous coils of a worm resembling the guinea worm. At one part there is a cavity laid open, and the coils of worm removed; it has the appearance of an abscess cavity.

39. 32. Parasitic Psorosperms. Gregarines. Fish.*Presented by Professor Young, 1898.*

The eye of a codfish showing a large number of white nodules in the sclerotic, arranged in stellate groups of from 6 to 10, which are colonies of the parasite. A portion of the eyeball is cut out to show the exact position of the colonies in the sclerotic.

39. 33. Parasitic Psorosperms. Fish.*Presented by Dr. R. M. Buchanan, 1898.*

Portion of fish muscle (haddock) presenting a measley appearance, which is due to the presence of innumerable colonies of the parasite.

SERIES 40.

ANATOMY OF THE KIDNEY AND URETER.

<i>The Shape and Structure of the Kidney,</i> . . .	1-26
<i>The Blood-vessels of the Kidney,</i> . . .	27-40
<i>The Comparative Anatomy of the Kidney,</i> . . .	41-61

40.1. The Right Kidney, Pelvis of Kidney, and Ureter.

Hunterian. X. 1.

“The right human kidney; the ureter and pelvis distended with injection, and one side of the kidney after this removed. It shows the shape of the kidney, the thickness of its flesh, and that it is hollow within.” The hollow is the hilum, by which the blood-vessels enter and the ureter passes out. The pelvis of the kidney and its branches, the calyces—the collecting receptacle into which the secretion is poured by the excretory tubes, and from which it is carried off by the ureter—are greatly overdistended.

40.2. The Right Kidney, Pelvis, and Ureter.

Hunterian. X. 2.

Half of a right human kidney, injected red. “The ureter and pelvis were injected with spirits till it became hard, and then one side was removed.” The pelvis is opened to show its cavity—an irregular space, with branches called “calyces” projecting from it, and embracing the pyramids. Compare succeeding specimens.

40.3. The Medullary Pyramids of the Kidney.

Hunterian. X. 3.

A kidney divided transversely to show the breadth of its cavity,

and the pyramids (mamillae, or nipples) projecting into it. Most of the pelvis and calyces have been cut away.

Structure of the Kidney.

40.4. Foetal Kidney to show Lobulation. *Hunterian. X. 20.*

"Foetal human kidney lobulated like the bear's, though it afterwards becomes simple like the lion's. The arteries injected red, the veins black." Compare Comparative Anatomy specimens, Nos. 40.42 to 40.45.

40.5. Foetal Kidney showing Lobulation and the Mamillae.

Hunterian. X. 21.

A similar kidney divided longitudinally, showing the lobulation, and the mamillae or nipples, one to each lobule, projecting into the calyces of the pelvis.

40.6. The Kidney of a Young Subject, showing the Mamillae.

Hunterian. X. 219.

The lobulation has now disappeared, but traces of it remain in the distinct mamillae.

40.7. The Cortex and Medulla of the Kidney.

Hunterian. X. 22.

Kidney, boiled and divided in longitudinal antero-posterior section, to show that it consists of (1) an outer lighter-coloured part called the cortex, which consists of the secreting apparatus, and (2) central lobules or "pyramids of the medulla," which are composed chiefly of the collecting tubules or excretory ducts of the uriniferous tubules, gathered together into nipple-like processes which project into the calyces of the pelvis.

40.8. The Cortex and Medulla of the Kidney.

Hunterian. X. 23.

The remaining portion of the preceding.

40.9. The Cortex and Medulla of the Kidney.*Hunterian. X. 24.*

Half of a kidney divided longitudinally, coarsely injected red, showing the above. The cortex, the secreting part of the gland, is much more vascular than the medulla.

40.10. The Pelvis and Pyramids of the Kidney.*Hunterian. X. 31.*

Half of a kidney and pelvis injected red, and divided longitudinally, "showing the vascularity of the organ, but chiefly the nipples or mamillae of the kidney mouthed or pouting into its cavity; the nipples are the pyramidal tops of the tubular portion, and are perforated by a number of holes, the terminations of the excretory ducts of the kidney." See Nos. 40.22 to 40.26.

40.11. The Pelvis and Pyramids of the Kidney.*Hunterian. X. 32.*

Similar to the preceding.

40.12. The Mamillae or Pyramids of the Kidney.*Hunterian. X. 33.*

"A portion of human kidney uninjected to show the radiation of the mamillae, as well as their points." It looks as if torn in the line of the excretory tubes, and shows beautifully the manner in which they converge from the broad base in the cortex to the point of the mamilla, where they discharge the urine into the calyces of the pelvis.

40.13. The Pyramids and the Calyces of the Pelvis.*Hunterian. X. 34.*

One half of a foetal kidney injected red; two mamillae (pyramids) are seen projecting into the cavity of the pelvis.

40.14. The Pyramids and Pelvis of the Kidney.*Hunterian. X. 35.*

Half of a kidney of a young foetus, injected red, showing the above. The lobulation of the organ being still very distinct, it

shows nicely the relation of the areas of cortex and their corresponding pyramids of the medulla.

40. 15. A Pyramid of the Medulla of the Kidney.

Hunterian. X. 37.

Finely injected red.

40. 16. A Pyramid of the Kidney.

Hunterian. X. 41.

Similar to the preceding.

40. 17. The Medullary Pyramids of the Kidney.

Hunterian. X. 38a.

Half of a kidney from a young subject, injected red; the mamillae very numerous and long.

40. 18. The Medullary Pyramids of the Kidney.

Hunterian. X. 38b.

Half of a foetal kidney, injected red, showing the above.

40. 19. The Cortex and Medulla of the Kidney.

Hunterian. X. 39.

Half of a very large kidney, finely injected red, showing the cortex much more vascular than the medulla. The pelvis also appears very vascular. The points of the pyramids projecting into the calyces are very distinct.

40. 20. The Cortex and Medulla of the Kidney.

Hunterian. X. 40.

Similar specimen from a young subject. The upper end of the kidney not injected.

40. 21. Two Mamillae from Different Lobules, Coalesced at the Tip.

Hunterian. X. 44.

40.22. The Excretory Tubes of the Kidney. *Hunterian.*

Part of a large kidney, injected red by the arteries, black by the ureter, and divided so that the pyramids, cut in different directions, show the above. The tubules appear in transverse section as black dots, in longitudinal section as streaks, which can occasionally be seen branching, and are traceable almost up to the beginning of the cortex. Being not too finely injected, this specimen shows the glomeruli or Malpighian bodies dotted over the cortex.

40.23. The Excretory Tubes of the Kidney.*Hunterian. X. 51.*

One half of a kidney; "some red injection having been thrown into the pelvis by the ureter, is seen passing along the tubuli uriniferi."

40.24. The Excretory Tubes.*Hunterian. X. 54.*

A small portion of a kidney, the beginning of the tubules injected red by the ureter.

40.25. The Excretory Tubes of the Kidney.*Hunterian. X. 55.*

Similar to the preceding.

40.26. The Excretory Tubes of the Kidney.*Hunterian. X. 56.*

A slice from a "mamilla," showing the above. The kidney was injected red by the arteries, white by the veins.

*The Blood Supply of the Kidney.***40.27. The Blood-vessels of the Kidney.** *Hunterian. X. 57.*

"A thin slice directly through the middle of the kidney; the arteries are injected with spirit varnish, coloured with vermilion, the veins with white size." Dried, and mounted in turpentine. It gives a good idea of the arteries of the kidney generally; the

large trunks branch mostly in the region between cortex and medulla, and send innumerable branches into the former, which is evidently exceedingly vascular, and but few into the latter. In some places the red injection has entered the vessels of the glomeruli or Malpighian bodies, which "are seen hanging like berries on a bush from the arteries"; a lens is required to make this out properly; it is seen best about the lower end. The white injection has disappeared. The tubuli uriniferi can be traced the whole length of the pyramids. The specimen should be examined by transmitted, as well as by reflected light.

40.28. The Absence of Anastomoses in the Branches of the Renal Artery. *Hunterian. X. 9.*

"One half of a kidney injected by different branches of the artery with black, red, and white, to show that these do not anastomose as in other parts of the body. Pelvis injected yellow." At least the anastomoses are very small, if not altogether absent; *i.e.* the arteries of the kidney are end arteries, like those of the spleen and cortex of the brain, an anatomical fact which becomes of importance if one of them gets blocked (*e.g.* by embolism), when the whole area supplied by it gets cut off from the circulation and commonly undergoes necrosis.

40.29. The Absence of Anastomoses in the Branches of the Renal Artery. *Hunterian. X. 10.*

Other half of the preceding.

40.30. The Vascularity of the Kidney. *Hunterian. X. 26.*

"A portion of injected kidney, to show the vascularity of the cortical part." The medulla is fairly vascular also, numerous straight arteries running among the tubules. The cortex is speckled as if with spots of vermilion, which are the Malpighian bodies with their blood-vessels injected.

40.31. The Vascularity of the Kidney. *Hunterian. X. 28.*

A thin slice of kidney, finely injected red, dried, and mounted on black paper in turpentine. With a lens it shows the glomeruli fairly well.

40.32. The Structure of the Glomeruli. *Hunterian. X. 29.*

"A thin slice from the external surface of a kidney, finely injected, the arteries red, the veins white; the termination of the artery is seen to be a convolution on itself, and not a bag, as imagined by Malpighi." But there is a bag after all—viz., the capsule of Bowman. The white injection has faded. Dried and mounted on mica in spirit. Compare No. 40.27.

40.33. The Structure of the Glomeruli. *Hunterian. X. 30.*

Similar to the preceding, but not dried.

40.34. Very Fine Injection of the Kidney. The Uriniferous Tubules. *Hunterian. X. 45.*

"One half of adult human kidney, beautifully injected red; the injection, which was size, coloured with vermilion, passed into the veins, passed also through the tubuli uriniferi into the pelvis, having performed the round of the secretion; the tubuli are easily distinguished from the arteries, which, towards the point of the nipple, become smaller, whereas the former, by uniting with each other, become larger; in this injection, the cryptae (glomeruli) appear most evidently convoluted artery." A lens is required for proper examination of this specimen. In his lectures, William Hunter states that the tubuli uriniferi cannot be filled with injection from the arteries except by extravasation, which is, doubtless, what has happened in this specimen. The particles of a fine injection might pass between the endothelium of the capillaries, and between the epithelium of the tubules, without producing the appearance of a large extravasation, in such a dense, firm organ as the kidney.

40.35. Very Fine Injection of the Kidney. The Uriniferous Tubules. *Hunterian. X. 46.*

"The kidney of the other side; the veins only were injected, and with the same success; nothing can be redder than this preparation, except at the points of the mamillae, where the injection found so easy an outlet as to leave the tubuli at their orifices in many places." See preceding specimen.

40.36. Very Fine Injection of the Kidney. The Uriniferous Tubules.

Hunterian. X. 64.

"A slice of the kidney, No. 46 (now No. 40.35), steeped in spirit of wine and now in turpentine; every part as red as scarlet, tubular as well as cortical."

40.37. Very Fine Injection of the Kidney.

Hunterian. X. 47.

Half of a kidney, of which only part has been injected red, similar to the preceding specimens. "The tubuli very full on one nipple, and crossed by a bristle."

40.38. Very Fine Injection of the Kidney.

Hunterian. X. 48.

Lower part of the other half of the preceding.

40.39. Very Fine Injection of the Kidney.

Hunterian. X. 50.

"One half of a human kidney, injected by the arteries red; the tubuli also filled by them; was steeped in spirits of wine first."

40.40. Very Fine Injection of the Kidney.

Hunterian. X. —.

Half of a similar kidney, mounted in turpentine.

Comparative Anatomy of the Kidney.

40.41. Kidney of Monkey.

Hunterian. X. 63.

Half of the above, finely injected red. The injection has got into some of the tubules at the lower end.

40.42. Kidney of Bear.

Hunterian. X. 16.

"To show that it is lobulated or conglomerated, every single lobule having a nipple of its own, and an infundibulum or branch of the pelvis, distinct from the rest." Injected red.

40.43. Lobules of the Kidney. Bear. *Hunterian. X. 17.*

Three or four of the above detached from the rest of the organ.
Injected red.

40.44. Kidney of Wolf. *Hunterian. X. 12.*

Section "through the middle lengthways of the wolf's kidney," injected red. The medulla here appears as a uniform mass, not divided into papillae. Compare next specimen.

40.45. Kidney of Wolf. *Hunterian. X. 44a.*

Portion of the same kidney as the preceding, where the section has passed to one side of the centre. The medulla, though undivided in the centre (preceding specimen), is here seen divided into seven papillae. Note how they are embraced by the calyces of the pelvis.

40.46. Kidney of Lion. *Hunterian. X. 5.*

Whole. The veins injected red. All of the capsule, except the strips in which the larger veins are, is cut away, showing branches of those capsular vessels ramifying finely in the cortex of the organ.

40.47. Kidney of Lion. *Hunterian. X. 11.*

One half of the above, finely injected red. "Has but one nipple (pyramid), as it were, the tubular portion being quite uniform and undivided."

40.48. Kidney of Tiger. *Hunterian. X. 4.*

One half of the above, the veins finely injected red, the arteries white. Very similar to the lion's (Nos. 40.46-40.47), but larger and more elongated.

40.49. Kidney of Leopard. *Hunterian. X. 60b.*

One half of the above, "arteries, veins, and ureter injected red; some of the tubules are seen injected from the ureter."

40. 50. Kidney of Cat.*Hunterian. X. 7.*

Whole. The veins injected as in the lion's (No. 40.46), showing the ramifications of the capsular vessels.

40. 51. Kidney of Cat.*Hunterian. X. 62.*

One half; injected red. A miniature of the leopard's or lion's. No lobulation.

40. 52. Kidney of Cat.*Hunterian. X. 6.*

Whole. The veins of the capsule injected with mercury. Dried and mounted in turpentine.

40. 53. Kidney of Elephant.*Hunterian. X. 116.*

Half of a very large kidney; not described in the old catalogue. Probably that of an elephant.

40. 54. Tubules of Kidney. Elephant.*Hunterian. X. 61.*

"A portion of a small elephant's kidney; the tubuli injected by the pelvis for a considerable way along the mamillae. Does not appear so large as either the horse's or the ass's." *Vide* Nos. 56-58 of this series.

40. 55. Kidney of Lamb. Foetal.*Hunterian.*

One half; uninjected.

40. 56. Kidney of Horse.*Hunterian. X. 58.*

The whole kidney, opened from the edge into the pelvis, which had been injected red, showing the excretory tubes of the uriniferous tubules filled for some distance. The medulla is little more lobulated than in the lion.

40. 57. The Uriniferous Tubules. Kidney of Horse.*Hunterian. X. 58.*

"One of the mamillae with its cortical substance, from the horse; the tubuli uriniferi are injected red from the pelvis (nearly) to

the very surface of the kidney, exceedingly beautiful and distinct; they can even be seen uniting with one another by the naked eye."

40. 58. Kidney of Ass. *Hunterian. X. 60.*

One half of the above, beautifully injected red from the pelvis. The excretory tubes seem to rise and run straight in from the very surface of the organ, and they are injected for their whole length. There is very little lobulation. The arrangement of the tubules is peculiar; at both ends the greater portion of them converge like the barbs of a feather towards a common duct or set of ducts, which run a considerable course before they reach the pelvis.

40. 59. Kidney of Porpoise. *Hunterian. X. 18.*

The ureter injected green. It is composed of a large number of small independent lobules, the connective tissue between which has been destroyed to show the lobulation.

40. 60. Kidneys of Frog. *Hunterian. X. 108.*

Injected red.

40. 61. Rectum and Bladder of Turtle. *Hunterian. AA. 24.*

Both slit open. The bladder opens into the rectum, or cloaca, considerably above the anus.

SERIES 41.

INJURIES AND DISEASES OF THE KIDNEY AND URETERS.

I. CONGENITAL DEFECTS AND MALFORMATIONS, . . .	1-5
II. INJURIES,	—
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V. TUMOURS,	41-52

I. CONGENITAL ABNORMALITIES.

41.1. Horseshoe Kidney. *Hunterian. X. 120.*

The lower portion of the trunk of a young child ; the intestines removed, showing the above. Both kidneys are turned so as to bring their lower ends together, and they have coalesced into a crescentic mass. They are both somewhat flattened, with their pelves looking forwards and upwards. The suprarenals are very large, as usual in infants.

41.2. Horseshoe Kidney. *Hunterian. X. 79.*

“The lower part of the trunk of a child at birth,” opened to show what “is termed the horse-shoe kidney.” They are united in

the form of a crescent, which extends much higher on the left side, the right kidney being displaced downwards so as to lie across the promontory of the sacrum. The right kidney is flattened antero-posteriorly, its pelvis is turned forwards, and the ureter runs down almost in the middle line of the body. The left is nearly normal in shape and position, and its ureter runs down in a groove which corresponds with the point of coalescence of the two kidneys. The right suprarenal is situated a considerable distance above its kidney, on much the same level as its fellow of the left side.

41.3. Double Ureter and Pelvis. *Presented by Professor Young.*

Right kidney hung by a portion of aorta and the renal vessels, which had been filled with plaster of Paris; also the bladder and the ureters of both sides. The ureters of this kidney emerge separately from the pelvis and unite about 2 cm. from the bladder. The lower one is slightly the larger. The ureter of the other kidney is single. It is slightly larger than either of the others.

41.4. Double Ureter and Pelvis. *Hunterian. X. 75.*

Kidney, part of one side removed, showing two distinct ureters and pelves; injected green.

41.5. Double Ureter and Pelvis. *Hunterian. X. 75a.*

Kidney, injected red, part of one side removed, showing two distinct ureters and pelves.

II. INJURIES OF THE KIDNEY AND URETER.

Specimens wanted.

III. CHANGES IN THE KIDNEYS AND URETERS DUE TO CONDITIONS AFFECTING NUTRITION AND VARIOUS LOCAL CAUSES, INCLUDING RENAL CALCULI.

41.6. Bilateral Hydronephrosis. *Hunterian. X. 90.*

Two kidneys with their ureters and part of the bladder showing the above. "The kidneys are tuberculated, one enlarged, the

other shrunk ; the ureter and pelvis of both are much enlarged, particularly that of the shrunk kidney ; the enlarged kidney is opened on the convex side, to look on the enlarging infundibula, which are encroaching on the flesh of the kidney, and twice or three times their natural size." The atrophy of the kidney substance has gone much further in the shrunk kidney, which is reduced to a congeries of cysts opening into the dilated pelvis. The orifices of the ureters are patent. The obstruction must therefore have been in the prostate gland or urethra.

41.7. Hydronephrosis.

One half of a large hydronephrosis. Prepared by distending the ureter, pelvis, and kidney with spirit, and removing one side after it became hard. Shows the ureter and pelvis greatly distended, the renal vessels stretched out over it, and the kidney itself reduced to a loculated cyst, with walls no more than 5 mm. thick, consisting of the fibrous capsule and remains of the renal cortex. The pyramidal substance has been completely destroyed.

Renal Calculi and Concretions.

41.8. "Calcareous" Deposit in the Uriniferous Tubules.

Hunterian. X. 94.

"A portion of kidney, where the tubuli uriniferi contain calcareous earth. Presumed to be the beginning of stone in the kidney." The deposit is seen as some indistinct white streaks in the pyramids of the medulla.

41.9. Crystalline Deposit in the Uriniferous Tubules.

Hunterian. X. 96.

"Two halves of a kidney where calcareous earth is seen in many places blocking up the extremities of the tubuli uriniferi." The deposits are indicated by bristles ; they appear as radiating clumps of yellowish streaks in the points of the pyramids. They are crystalline masses of phosphates. (MS. Notes, J.H.T., p. 128.)

41.10. Minute Calculi in the Kidney.

Hunterian. X. 97b.

"A kidney laid open and hanging by the pelvis, to show vast

numbers of little yellow stones, small as pin-heads, formed about the points of the mamillae; they were probably passing off by the urine, but might lay the basis of large stone in the bladder." Only a few are visible. They are quite rotten and disintegrating. They consist of uric acid and crystals of calcium oxalate mixed with blood. (MS. Notes, J.H.T., p. 128.)

41.11. Renal Calculus.

Hunterian. X. 97a.

A portion of kidney showing a small dark brown stone embedded in one of the calyces of the pelvis. It is breaking down. A fragment of it was found to be uric acid. (MS. Notes, J.H.T., p. 128.)

41.12. Renal Calculus Impacted in the Ureter. Atrophy of the Kidney Tissue.

Hunterian. X. 98.

A kidney slit open from its convex edge, showing a small nodulated calculus impacted in the ureter. The pyramids have atrophied and disappeared, and a condition of hydronephrosis has been established at their expense. Compare succeeding specimens. There is also a smaller calculus in one of the calyces, where it is kept by a stitch. They are composed of calcium oxalate—"mulberry" calculi. (MS. Notes, J.H.T., p. 128.)

41.13. Renal Calculus. Atrophy of Kidney Tissue. Hydro-nephrosis.

Hunterian. X. 99.

One half of a kidney showing a black stone of considerable size, partly filling the pelvis, and blocking the ureter. As in the preceding, the pyramids have atrophied, and the pelvis and its calyces have dilated considerably. There are several smaller stones in the calyces at the lower end. It is a mixed calcium oxalate and uric acid calculus. (MS. Notes, J.H.T., p. 128.)

41.14. Renal Calculus Impacted in the Ureter. Hydro-nephrosis.

Hunterian. X. 105.

A kidney with the pelvis opened, showing a large stone impacted in the ureter. It also fills up the lower part of the pelvis, moulded accurately to its shape. Its base is hollowed out as if accretion

were taking place mostly round the edges. The pelvis of the kidney is considerably dilated, and the renal tissue has, to a very large extent, atrophied. The organ, though not much altered from the normal in size and shape, is converted into a multilocular cyst with thin walls, the number and situation of the loculi corresponding with the position of the calyces, as is seen better in the specimens which are laid open. The calculus is very soft, rotten with long immersion in spirit, and consists chiefly of uric acid, with a shell of calcium oxalate. (MS. Notes, J.H.T., p. 128. Matthew Baillie's *Engravings*, Fasc. VI., Pl. V., fig. 2.)

**41. 15. Kidney with Double Pelvis and Single Ureter.
Large Calculus in the Lower Pelvis, with Pro-
jection into the Upper. Complete Atrophy with
Hydronephrosis of the Lower Part of the Kidney.
Slight Hydronephrosis of the Upper Part.**

Hunterian. X. 104.

The kidney showing the above peculiarities is about the normal size, and the difference between the upper and lower parts is very striking. The lower part, with its pelvis, is converted into a thin-walled loculated cyst, with no trace of renal tissue remaining. The upper, from the outside, appears normal, but its pelvis is considerably dilated, and its cavity can be felt to be enlarged, but it is surrounded by a considerable thickness of renal tissue. The upper pelvis is very long, and passes down, curving round the lower end of the lower one, which thus comes to open into it from above. The ureter appears to be a direct continuation of the upper pelvis. There is a large stone filling the lower part of the lower pelvis (the greatly dilated one) and impacted in the narrow orifice leading into the upper pelvis. It is united at about right angles, by a narrow neck, to a small elongated calculus, which lies in the lower part of the upper pelvis, projecting into the ureter, and completely blocking it. The calculi are composed of calcium oxalate, and are coated with brown organic debris. (MS. Notes, J.H.T., p. 128.)

**41. 16. Renal Calculus. Complete Atrophy of the Kidney.
Large Hydronephrosis.**

Hunterian. X. 87a.

A kidney greatly dilated, and converted into a thin-walled loculated cyst. The pelvis of the kidney is occupied by a large white

calculus with a small brown tip, which is impacted in the ureter. The kidney is opened at various places, showing the thinness of the walls. The septa between the loculi show that they originate from greatly dilated calyces—the lobulation of the cyst resembles that seen in the foetal human kidney, in which each lobule consists of a portion of cortex with a medullary pyramid, each pyramid being embraced by a separate calyx. The small brown stone appears to have been the starting point of the disease; it is composed of calcium oxalates coated with mixed phosphates of calcium and magnesium. The large white mass has been added later, and it also consists of mixed phosphates. (MS. Notes, J.H.T., p. 128. Matthew Baillie's *Engravings*, Fasc. VI., Pl. VI.)

41.17. Calculus Impacted low down in the Ureter. Hydro-nephrosis followed by Contraction of the Kidney.

Hunterian. X. 107.

A kidney injected red, with the ureter and trigon of the bladder, partly slit open, showing the upper part of the ureter and the pelvis and calyces dilated in the usual manner. There has been considerable atrophy of the kidney, which has been followed by contraction, and the kidney is now of small size. The calculus is about the size of a kidney bean. It is impacted about 5 cm. from the bladder. Composed of mixed phosphates. (MS. Notes, J.H.T., p. 128.)

41.18. Renal Calculus Impacted in the Ureter. Pyonephrosis.

Hunterian. X. 91.

A kidney and part of the ureter, one side cut away, showing a small calculus in the ureter, and the whole organ converted into a loculated cyst with fairly thick walls. It was “filled with scrophulus pus—a substance thick and cheesy, or like mortar just ready to be used for building.” This matter has been removed. Apparently an old calculous pyonephrosis, in which the pus was beginning to be infiltrated with calcareous matter. The specimen is considerably smaller than a normal kidney.

41.19. Renal Calculus. Complete Destruction of the Kidney.

Hunterian. X. 107a.

This and the following specimen are described as “the kidneys

of Mr. Lumsden, who died of suppression of urine; one kidney was quite destroyed by a ragged stone nearly the size of a walnut; the other was very pulpy, and had a stone in the ureter plugging it up." This specimen is the first mentioned kidney; it is converted into an irregular clump of thin-walled cavities, without a trace of renal tissue. The calculus is phosphatic. The next specimen (X. 107*b*) shows the other kidney. The cortex has been pared off it, and several of the medullary pyramids can be seen of fairly normal appearance, with rather pulpy cortex between them. The pelvis is considerably increased in size. The kidney was evidently functionally active to a certain extent, as "there was water in the bladder after death." The urethra was patent. The calculus is composed of uric acid. (MS. Notes, J.H.T., p. 129.)

41.20. Renal Calculus Impacted in the Ureter.

Hunterian. X. 107b.

The other kidney from same subject as the preceding, which see.

41.21. Kidney with Dilated Pelvis, containing Minute Calculi.

Hunterian. X. 106.

Most of the calculi have been removed, but deep in the calyces of the pelvis a number are still to be seen. They are composed of uric acid. Said to have been "perhaps 500," about the size "of small pinheads." The artery is injected red; the vein yellow. Some of the lymphatics were also injected. (MS. Notes, J.H.T., p. 128.)

41.22. Large Branched Calculus in the Kidney.

Hunterian. X. 103.

A kidney with part of the ureter, one side removed, showing a large white calculus, which fills the upper part of the pelvis, "ramifying as the infundibula," and presses on, and has destroyed a considerable part of the renal tissue. There are a number of retention cysts scattered about the kidney.

41.23. Large Branched Renal Calculus. *Hunterian. X. 100.*

A kidney, injected red and one side cut away, showing the pelvis and its infundibula or calyces dilated and occupied by a

large branching calculus, of dark colour externally, internally yellowish. There is considerable atrophy of the apices of the pyramids, leaving spaces around the ends of the processes of the calculus. The pelvis does not grasp it tightly, and the ureter is patent (part of a bougie is placed in it), so that the urine has been able to escape. The other kidney was occupied by a similar calculus. They are both composed of uric acid and calcium oxalate, the latter forming the dark outer crust. See succeeding specimen. (MS. Notes, J.H.T., p. 128.)

41.24. Large Branched Renal Calculus. *Hunterian. X. 101.*

The kidney "from the other side, in the same woman" (as No. 41.23). "Old; in the dissecting room." The branches of the calculus are hardly so large, but the body of it fills the pelvis more completely. There is much greater dilatation of the calyces, and more atrophy of the renal tissue. A bougie is placed in the ureter. (Matthew Baillie's *Engravings*, Fasc. VI., Pl. V., fig. 1.)

41.25. Renal Calculus. Atrophy of the Kidney.

Hunterian. X. 102.

Part of a kidney injected red, showing a ramifying calculus embedded in the lower part of the kidney, leaving the pelvis clear. The atrophy around the stone is very considerable. The pelvis is somewhat dilated, and the pyramids in the upper part also of the organ are atrophied. The cause of this is not apparent. The calculus is composed of mixed phosphates, and presents in parts a crystalline appearance. (MS. Notes, J.H.T., p. 128.)

41.26. Numerous Calculi in the Kidney. Pyonephrosis.

Hunterian. X. 101a.

"A very large kidney quite filled with stones and pus, the cavities containing both laid open." The stones lie deeply embedded in the kidney, many of the cavities extending to the external surface. They are of a mottled brown and white colour, and composed of mixed phosphates. (MS. Notes, J.H.T., p. 128.)

IV. CHANGES DUE TO INFLAMMATORY DISEASE.

41. 27. Suppurative Nephritis. *Hunterian. X. 115.*

"A small portion of kidney apparently with small ulcerations in different parts of it." Apparently a number of small abscesses.

*Tuberculosis of the Kidney.***41. 28. Tuberculosis of the Kidney.** *Hunterian. X. 93b.*

A kidney split open, and the two halves mounted, cut surfaces outwards, showing a number of caseous masses, and ulcers eating into the glandular tissue. The pelvis is slightly dilated. Microscopic examination showed the condition to be tubercular. Formerly described as "scrophulous." (MS. Notes, J.H.T., p. 101.)

41. 29. Tuberculosis of the Kidney. Advanced.*Hunterian. X. 93c.*

The other kidney from the same subject as the preceding, mounted in the same way, showing the pelvis dilated and the papillae and most of the pyramids destroyed by ulceration, which in some places has almost reached the surface of the cortex. The cavity is irregular and loculated, and lined by caseating tubercular membrane. (MS. Notes, J.H.T., p. 101.)

41. 30. Tuberculosis of the Kidney. *Hunterian. X. 93d.*

A slice of the cortex of a kidney showing a number of caseating tubercular foci. (MS. Notes, J.H.T., p. 101.)

41. 31. Tuberculosis of the Kidney. Hydronephrosis.*Hunterian. X. 92b.*

A kidney opened in such a way as to show the calyces of the pelvis considerably dilated, and a couple of tubercular ulcers eating into the glandular tissue.

41. 32. Tuberculosis of the Kidney. *Hunterian. X. 112.*

One half of a kidney showing a large tubercular ulcer, extending from the pelvis, which has destroyed nearly the whole of the

glandular tissue at one end: the pelvis is dilated. "From the dissecting room." Compare next specimen.

41.33. Tuberculosis of the Kidney. *Hunterian. X. 113.*

Half of the other kidney from the same subject as the preceding, showing the tubercular destruction of the organ considerably further advanced. (Matthew Baillie's *Engravings*, Fasc. VI., Pl. IV., fig. 1, where it is described as "scrofulous.")

41.34. Tuberculosis of the Kidney. Cicatricial Contraction. *Hunterian. X. 93.*

Part of a kidney split open showing its lower end converted into a series of tubercular abscess cavities. They are enclosed in a thin fibrous rind, and a number of tubercular masses project from the outer surface. The capsule of the kidney has been torn off, leaving a rough fibrous surface. There are a number of simple retention cysts in the organ.

41.35. Tuberculosis of the Kidney and Ureter. Advanced. *Hunterian. X. 92.*

One half of a kidney, which, with the ureter, has been carefully split, showing an advanced stage of the above disease. The kidney is converted into a series of cavities, communicating with one another, lined by caseating tubercular granulations. The proper renal tissue is almost completely destroyed. The tubercular process extends right down the ureter, the cavity of which is also filled with caseous debris. (MS. Notes, J.H.T., p. 100.)

41.36. Tuberculosis of the Kidney and Ureter. Advanced. *Hunterian. X. 92a.*

The other half of the preceding. (Matthew Baillie's *Engravings*, Fasc. VI., Pl. IV., fig. 2. Described as "scrofulous.")

41.37. Tuberculosis of the Kidney. Very Advanced. *Hunterian. X. 93a.*

A kidney somewhat shrunk, and rendered irregular by cicatrices, laid open on one side to show that it was reduced to a series of

cavities, "which were full of serophulous matter, and resembled the cheesy matter of the suppurated serophulous absorbent glands." Very similar to the preceding.

41.38. Remains of a Kidney Destroyed by Tuberculosis or Pyonephrosis. *Hunterian. X. 111a.*

"A kidney wasted to a fifth of its natural size, and forming chiefly a bag of serophulous matter." A kidney laid open showing the final stage which is found in both of the above conditions; the whole of the glandular substance has been destroyed, and the organ converted into a thin walled loculated cyst full of pultaceous debris. The contents dry in and become infiltrated with lime, and the capsule shrinks irregularly around them, as shown in the specimen.

41.39. Cicatricial Contraction of the Kidney.

Hunterian. X. 80a.

Half of a kidney of which the pelvis has been dilated. The surrounding kidney tissue is mostly fibrous, and externally is rough from the tearing off of the capsule. "As a specimen of wasting kidney." Probably shrinking after hydronephrosis.

41.40. Atrophic Kidney.

Hunterian. X. 111.

"A kidney from an old woman (dissecting room), either wasted or which was never larger than renal capsule itself, which stands over it: one half is attached to blue paper to look on the outside surface, which is granulated from vast numbers of little brown vesicles" (retention cysts), "the emulgent (renal) artery is seen rising from the aorta, not one fifth the diameter of the opposite one." Probably wasting of the kidney after pyelitis. There are some small round vesicles in the ureter, probably tubercles.

V. TUMOURS OF THE KIDNEY.

(a) *Cysts.*

41.41. Simple Cysts of the Kidney.

Hunterian. X. 82.

A kidney split open showing externally several small cysts, and in the midst of its substance one about as large as a walnut,

which is loculated as if formed by the coalescence of several. Otherwise the kidney appears to be normal. These cysts are supposed to be of congenital origin.

41.42. Simple Cyst of the Kidney. *Hunterian. X. 83.*

A kidney laid open showing a large thin walled cyst projecting from its lower end. Otherwise it appears to be normal.

41.43. Simple Cyst of the Kidney. *Hunterian. X. 84.*

A kidney showing a large cyst projecting from its lower end. It is opened, has thin transparent walls, and its cavity extends a considerable distance into the organ, which otherwise appears to have been normal.

41.44. Simple Cyst of the Kidney. *Hunterian. X. 84a.*

A large kidney injected blue by the artery and vein, white by the ureter, showing a large thin walled cyst occupying and projecting from its lower end. Otherwise apparently normal.

41.45. Cysts in a Granular Contracted Kidney.

Hunterian. X. 84b.

A kidney with the capsule in part torn off, showing the rough surface of a cirrhotic kidney. It is studded with cysts of various sizes, from very minute up to one nearly as large as a walnut, which has been laid open. The large cyst appears to be of the nature of the preceding, *i.e.* congenital; the minute ones are probably the result of the interstitial nephritis. (Matthew Baillie's *Engravings*, Fasc. VI., Pl. VIII., fig. 1.)

41.46. Cysts in a Granular Contracted Kidney.

Hunterian. X. 83.

A kidney irregularly contracted, and presenting the rough surface of interstitial nephritis; showing one large cyst, and also myriads of minute ones scattered through its substance. The large one is probably congenital, the minute ones the result of the nephritis.

*(b) Congenital Cystic Transformation of the Kidneys.***41.47. Cystic Transformation of the Kidneys.***Hunterian. X. 85.*

One half of a kidney greatly increased in size, and apparently composed of a congeries of thin walled cysts of various sizes, with traces of renal tissue between. "An attempt was made towards injecting them, but they were too tender to bear it; masses of the injection are seen about the pelvis of the organ. (From Mr. C. Hawkins, St. George's Hospital.)" (Matthew Baillie's *Morbid Anatomy*, Fasc. VI., Pl. VII., fig. 1 and 2.)

41.48. Cystic Transformation of the Kidneys.*Hunterian. X. 86.*

The other half of the preceding.

41.49. Cystic Transformation of the Kidneys.*Hunterian. X. 87.*

"The kidneys of Mr. Hume, Navy Surgeon, who died of the gout in his stomach, had sometimes suppression of urine, and was supposed to have the stone in his bladder, which was imagined to be cured for two years before he died, by eating honey. The kidneys are transformed into a larger mass of hydatids than was ever seen before, some of them as large as one's fist, many of them as large as an orange, others like plums, etc.; a little portion of corticle substance remains unchanged and injected red, but there is even here something like disposition to become hydatid; he made water freely enough. The aorta and cava, for some way above and below the emulgents, lie on the upper part of the preparation, the kidneys being in their place as nearly as possible with respect to the body supine. There was a stone of a hemispherical shape, and half an inch in diameter, in the pelvis of one kidney." The term "suppression of urine" is commonly used by William Hunter and his contemporaries, with the meaning of "retention of urine," *i.e.* it is secreted but cannot be voided. He says, however, in his lectures (MS. R.C.S. Eng. 42, c. 29, p. 477), speaking of "total suppression": "I do not mean a suppression of its evacuation from the bladder, but a suppression of its secretion from the blood." Here it probably meant only retention. Compare No. 43.48.

41. 50. Cystic Transformation of the Kidneys.*Hunterian. X. 88.*

“One half of the right, and of the left kidney, from a man who died in the Westminster Hospital.” Of the same nature as the three preceding specimens.

41. 51. Cystic Transformation of the Kidney. —

A kidney split open showing the cortex riddled with thin walled cysts filled with brownish material, which is tough, hyaline, and structureless under the microscope, and is probably the coagulated contents of the cysts.

*(c) Carcinoma and Sarcoma of the Kidney.***41. 52. Carcinoma of the Kidney.***Hunterian. X. 81a.*

One half of a kidney which has been transformed into a large solid tumour. A small corner at the upper end appears normal, the rest of the mass is tumour. The main mass, occupying the middle region of the kidney, is to a large extent necrotic. In the lower end, portions of renal tissue (medullary pyramids) are visible in the midst of living tumour tissue, which appears to be infiltrating them. The new growth has also infiltrated the capsule in places, and has almost obliterated the pelvis of the kidney. Microscopic examination shows a very mixed structure; some parts certainly suggest carcinoma, but it is so altered by time, that no definite diagnosis can be given. It is clearly of a malignant nature. (MS. Notes, J.H.T., p. 99.)

SERIES 42.

ANATOMY OF THE BLADDER AND MALE GENITAL ORGANS.

<i>The Bladder,</i>	1-13
<i>The Base of the Bladder and Prostate Gland, etc.,</i> .	14-25
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(a) *The Bladder.*

42.1. Position of the Bladder in an Infant.

Hunterian. AA. 1a.

“The pelvis of a child at birth; to show bladder high up in the abdomen, uterus turned up, and ovaria also higher than the edge of the pelvis.” Injected red.

42.2. The Adult Human Bladder in the Distended State.

Hunterian. AA. 3.

“One half of the adult human bladder, previously distended and hardened with spirits to make it retain its shape; a bristle is introduced into the lacuna of the caput gallinaginis (utricle masculinus), near which the orifices of the vesiculae seminales are seen; in the lower part of the bladder, the orifice of one ureter is seen, about an inch and a half behind the last-mentioned orifices; on the edge all round the upper half may be seen the peritoneal coat externally, the internal (mucous) coat within, and the muscular

coat between the two." Shows also fairly accurately how far the peritoneum extends down between the bladder and the rectum. Compare No. 42.14.

42.3. "The Human Bladder in its Contracted State."

Hunterian. AA. 4.

It is of the same shape as the distended bladder. It is hung by the membranous part of the urethra; the ureters are seen on each side entering the bladder.

42.4. The Bladder in a State of Complete Contraction.

Hunterian. AA. 7.

"The bladder in the state it was found after death, very much contracted; as a proof of its muscular powers, being almost a solid ball. Bristles are in the ureters."

42.5. "The Bladder in its Contracted State."

Hunterian. AA. 7b.

"One half of the bladder in its contracted state, opened in order to show the internal membrane thrown into rugae, like the inner membrane of the stomach in the same condition."

42.6. "The Bladder in its Contracted State."

Hunterian. AA. 7c.

The other half of the preceding.

42.7. The Muscular Coat of the Bladder.

Hunterian. AA. 8.

A bladder distended and hardened in spirit, opened in front, illustrating the above. "From a man who had a stone; the muscular coat in some parts is half an inch thick in consequence of greater exercise. The inner coat is uneven, and looks fasciculated from the projection of the muscular fibres behind." On the back of the specimen, the longitudinal bundles of muscle called the detrusor urinae are very well marked. The ureters are considerably dilated. Below them are seen the vasa deferentia and vesiculae seminales.

42. 8. The Mucous Membrane of the Bladder.*Hunterian. AA. 9.*

One half of a bladder injected red, filled with spirit and hardened before division, showing the mucous membrane thrown into irregular folds; also its vascularity. A bristle shows the very oblique passage of the ureter through the thick walls of the organ.

42. 9. The Mucous Membrane of the Bladder.*Hunterian. AA. 10.*

The posterior part of the bladder of a female child, the uterus with the Fallopian tubes hanging on the back part, finely injected red, suspended by the neck of the bladder. It appears still more vascular than the preceding; the surface of the mucous membrane is smoother from greater distension.

42. 10. The Ureters.*Hunterian. AA. 12.*

"A portion of female bladder, to show the openings of the ureters and urethra; spread on a card; near the neck of the bladder there is a follicular appearance."

42. 11. The Mucous Glands of the Bladder.*Hunterian. AA. 12a.*

The posterior part of a female bladder; "the internal membrane seems everywhere follicular, and near the neck of the bladder a cellular porous appearance, probably follicles which run in the direction of the orifices of the ureters." They are the orifices of the mucous glands, which are most numerous at this point. Compare No. 42.13.

42. 12. The Neck of the Bladder in the Female.*Hunterian. AA. 13.*

The base of the female bladder with the urethra, opened in front, showing the oval slit-like orifices of the ureters, and in the floor of the urethra, an elongated elevation corresponding to the caput gallaginis of the male. See Nos. 42.14 *et seq.*

42.13. The Neck of the Bladder in the Female.*Hunterian. AA. 13a.*

A similar preparation with bristles in the ureters. The triangular area between them and the urethra is called the trigone of the bladder; its mucous membrane is free from wrinkles, and presents "a honeycombed surface like that of the internal surface of the gall bladder; it is very beautiful, and probably a secretory surface for mucus": it contains numerous mucous glands. It is much larger in the male. *Vide* next specimen.

(b) *The Base of the Bladder, the Prostate and Cowper's Glands, Vesiculæ Seminales and Vasa Deferentia, and the Prostatic Portion of the Urethra.*

42.14. The Base of the Bladder in the Male, with the Prostate Gland, Vesiculæ Seminales and Vasa Deferentia, and the Urethra. *Hunterian. AA. 15.*

The posterior part of the bladder, with related structures, finely dissected and the urethra opened from above. From before are seen the orifices of the ureters with bristles in them, showing the direction in which they enter the bladder (inwards and forwards). In front of them lies the orifice of the urethra, these three forming the points of the triangular area called the "trigone of the bladder." The two halves of the prostate are pressed aside, showing the floor of the prostatic urethra, with the caput gallinæ or crista urethrae rising from it. The openings of the two ejaculatory ducts of the vesiculæ seminales and vasa deferentia (marked with bristles) not close together as usual, but the one about 3 mm. in front of the other. By the side of the posterior is seen the sinus pocularis or utriculus masculinus, the homologue of the female genital passages. From behind are seen the vesiculæ seminales with the twisted vasa deferentia internal, and the ureters (marked with bristles) external to them. Further forward lie the two lateral lobes of the prostate gland, and in front of that Cowper's glands, only partially dissected. Between the vasa deferentia there is a small area of the bladder behind the trigone which is in contact with the rectum; above that they are separated by the recto-vesical pouch of the peritoneum. Compare No. 42.2.

42.15. The Base of the Bladder in the Male, with the Prostate and Cowper's Glands and the Vesiculæ Seminales and Vasa Deferentia. *Hunterian. AA. 16.*

Similar to the preceding, but with the roots of the corpora cavernosa and bulb of the urethra. Cowper's glands are seen as two small rounded bodies at the back of the bulb. Their ducts (marked with bristles) are seen opening in the floor of the urethra about 3 cm. further forward.

42.16. The Base of the Bladder, and the Prostate and Cowper's Glands. *Hunterian. AA. 20.*

A similar preparation to No. 42.14, "to show principally Cowper's glands lying on the under side of the membranous portion of the urethra, between the bulb and the prostate gland."

42.17. Cowper's Glands. *Hunterian.*

The prostate gland and part of the urethra opened from the front, showing the above, finely dissected, lying just behind the bulb, and their ducts opening in the penile part of the urethra, some distance further forward. (Specimen marked CC. 13 on jar.)

42.18. The Male Urethra. *Hunterian. AA. 14.*

A portion of the urethra, injected red (the brightness rather faded), and slit open, showing its vascular lining wrinkled longitudinally, and dotted with the orifices of mucous glands.

42.19. The Vesiculæ Seminales, Vasa Deferentia, Ejaculatory Ducts, and Ducts of the Prostate Gland, injected with Mercury. *Hunterian. AA. 17.*

The prostate is injected by eight or ten ducts, which open around the caput gallinaginis, beside the ejaculatory ducts. The cavities of the gland and of the vesiculæ are exaggerated by the injection. The junction of the vesicula seminalis and vas deferens into ejaculatory duct is very well shown. Dried and mounted in turpentine. Most of the mercury has escaped from the cavities of the vesiculæ.

42. 20. The Vesiculæ Seminales, Vasa Deferentia, Ejaculatory Ducts, and Ducts of the Prostate Gland.*Hunterian. AA. 18.*

Similar to the preceding; injected with mercury, dried, and mounted in turpentine.

42. 21. The Vesiculæ Seminales, Vasa Deferentia, Ejaculatory Ducts, Prostate, and Cowper's Glands.*Hunterian. AA. 22.*

A similar preparation, with the addition of Cowper's glands. Injected with mercury, dried, and mounted in turpentine.

42. 22. Cowper's Glands.*Hunterian. AA. 23.*

A portion of the urethra, injected with mercury, dried and mounted in turpentine, showing the above.

42. 23. The Vesiculæ Seminales and Vasa Deferentia.*Hunterian. Z. 4.*

The above finely dissected out, distended with spirits, hardened and opened to show their cavities, which are much exaggerated by the distension.

42. 24. The Vesiculæ Seminales and Vasa Deferentia. Utriculus Masculinus.*Hunterian. Z. 5.*

The base of the bladder and the prostate gland, showing the above on the back of the bladder, finely dissected, distended with spirits, and laid open, as in the preceding. From the front are seen the two ejaculatory ducts, opening in the caput gallinaginis, marked with bristles. Behind these is a third orifice, in the middle line, which leads into a blind sinus called the utriculus masculinus—the remains of the Mullerian ducts and the homologue of the female genital passages.

42. 25. The Vesiculæ Seminales and Vasa Deferentia.*Hunterian. Z. 6.*

Similar to No. 42.22. Injected with mercury, dried, and mounted in turpentine.

(b) *The Testicle.*

42.26. The Testicle, Spermatic Cord, and Tunica Vaginalis.

Hunterian. Y. 1.

“The tunica vaginalis was distended with spirit till hard, then a portion cut out on one side to show the enclosed testicle; a piece of wax pushed upwards shows how far the coat extends upwards, which is about one inch and a half above the testicle.” This is however, a variable condition. Compare descent of the testicle specimens. The wax had decayed, and has been replaced by a bristle.

42.27. The Testicle, Epididymis, and Tunica Vaginalis.

Hunterian. Y. 11.

A specimen similar to the preceding, but showing more clearly the relations of the tunica vaginalis to the epididymis.

42.28. The Relations of the Testicles to one another.

Hunterian. Y. 12.

“Both testicles, the tunica vaginalis removed and the cord a little dissected. The testicles are hung nearly *in situ naturali*, that is obliquely up and down, the larger end forwards and upwards, the smaller in the opposite directions, the one side outwards and the other inwards.” The anterior ends are a little inclined away from one another. It shows the above and also the general form of the epididymis and vas deferens. In front of the globus major of the epididymis are seen two or three little vesicles, which are remains of some of the end tubes of the Wolffian body.

42.29. The Testicle, Epididymis, and Spermatic Cord.

Hunterian. Y. 2.

The tunica vaginalis has been entirely removed, revealing the proper capsule or tunica albuginea of the testicle, and the organ is hung in its natural position by the spermatic cord, which is a little dissected. It shows the epididymis lying on the top of the testicle, its larger end—globus major—anterior and superior. The vas deferens rises from the lower and posterior end—globus minor

—internally, and passes up the back of the cord, with the blood vessels and nerves in a thick bundle in front of it.

42.30. The Epididymis and Vas Deferens.

Hunterian. Y. 13.

A testicle with the vas deferens and epididymis injected with mercury and dissected from it and partly unravelled. The epididymis appears as a single greatly convoluted tube.

42.31. The Blood-vessels of the Testicle. *Hunterian. Y. 3.*

A testicle and spermatic cord injected, the arteries red, the veins yellow, and the vas deferens with mercury. Carefully dissected, dried, and mounted in turpentine. The mass of the injections seems to have dissolved to a very great extent, but the colours in part remain. The spermatic artery is seen as a translucent red vessel amid a great plexus of veins, which are translucent or yellow, and there is a second smaller arterial twig near it. The vas deferens is also surrounded by a plexus of veins amid which runs the artery of the cord. The veins are very large and tortuous. A beautiful preparation.

42.32. The Blood-vessels of the Testicle. *Hunterian. Y. 5a.*

A testicle with the arteries and also, apparently, the veins injected red, and the tunica vaginalis spread out. It is dried and mounted in turpentine, showing numerous vessels ramifying on the epididymis and tunica vaginalis.

42.33. The Veins of the Testicle. *Hunterian. Y. 20*

A testicle with the veins injected green. Showing the great size and tortuosity which characterizes them in this part; they are called the pampiniform plexus of the spermatic cord.

42.34. The Fibrous Framework of the Testicle.

Hunterian. Y. 18.

A testicle finely injected red and almost divided transversely, showing the above, and the vascularity of the organ. The

glandular tissue is enclosed in a very thick, strong, fibrous membrane—the tunica albuginea testis; and at the point where the section is incomplete, a spongy fibrous mass, which is called the mediastinum testis, can be seen extending from the albuginea for a little way into the glandular mass. From it fine fibrous trabeculae (rather indistinct in this specimen) pass across the organ to the tunica albuginea at the other side. These three structures together form the supporting stroma of the testicle. Compare succeeding specimens.

42. 35. The Fibrous Framework and Nutrient Blood-vessels of the Testicle.

Hunterian. Y. 18a.

A testicle injected, the arteries red, the veins black, split open and partly unravelled, showing the above. In the middle of the specimen is seen the mediastinum. The arteries and veins run out from it along the inside of the tunica albuginea and in the trabeculae, forming a rich plexus. The old catalogue says of the arteries and veins that “neither the one nor the other can be traced into a tube,” a reference to a theory current in the early part of the eighteenth century, that fine branches of blood-vessels terminated in the secreting tubes of glands, a view to which William Hunter was opposed. See introduction.

42. 36. The Blood-vessels and Tubules of the Testicle.

Hunterian. Y. 19.

A testicle injected red by the arteries, black by the veins (the red degenerated into brown from impurities in the vermilion). The tunica albuginea is turned up at one side, and part of the glandular parenchyma removed, showing how the coiled tubules are arranged in elongated conical lobules, between which the larger branches of nutrient vessels run a straight course from the mediastinum across the organ. There is also an abundant plexus of vessels ramifying on the epididymis.

42. 37. The Tubular Substance of the Testicle.

Hunterian. Y. 21.

A portion of the gland finely injected red, and slightly dissected, to show the imperfectly separated lobules in which the coiled tubules are arranged.

42.38. The Lobulation of the Testicle. *Hunterian. Y. 22.*

"The body of the testicle, the albuginea turned up all round. The tubuli exceedingly convoluted are seen in separate parcels."

42.39. The Tubules of the Testicle. *Hunterian. Y. 23.*

A similar preparation with the tubules, "a little unravelled by maceration in water."

42.40. The Tubules of the Testicle. *Hunterian. Y. 25.*

Similar to the preceding ; a little more unravelled.

42.41. The Tubules of the Testicle. *Hunterian. Y. 26.*

A similar preparation beautifully unravelled, the tubules, though still convoluted, hanging for a length of fully 20 cm. They are rather thicker than human hair.

42.42. The Tubules of the Testicle injected with Mercury.

Hunterian. Y. 29b.

"An exceedingly beautiful and complete injection of the tubuli testis, epididymis and vas deferens (injected 1778); there is a small quantity of acid in the spirit to make the mercury appear more bright, the spirit otherwise renders the tubes blackish: some of the tubes are drawn out one inch and a half: epididymis and vas deferens are loose and disposed in a waving line over the testis: a few of the tubes are unfilled, but these taken together are not above one-tenth of the whole: and what was very remarkable, one side of the albuginea had been removed before the mercury had entered the testis, so that the injector saw the whole tubes filled in about a quarter of an hour." The process of preparation consisted in squeezing the testicle and epididymis and stripping the vas deferens till as much as possible of the fluid contents had been removed, then inserting a pipe into the vas deferens and allowing the mercury to flow in by gravitation, no great pressure being required.

42. 43. The Rete Testis and Epididymis injected with Mercury. *Hunterian. Y. 30.*

A somewhat similar but much less beautiful preparation, in which the tubules have been removed from one side to show the network of larger vessels in the mediastinum, called the rete testis, into which they open, and from which the epididymis originates by the vasa efferentia. See succeeding specimens, especially No. 42.45.

42. 44. "The Tubuli, Rete, Epididymis, and Vas Deferens." *Hunterian. Y. 31.*

"Injected with mercury. The testicle was a small one, and the tubuli appear few, but unravelled and hanging down four or five inches, to show that the preparations 26 and 27 (the preceding) were really those of unravelled tubuli: spread on blue paper: changed in 1778, and length of tubes now less as parts broke off in removing." Fresh turpentine, 1896. No further damage done.

42. 45. Testicle injected with Mercury by the Vas Deferens. *Hunterian. Y. 32.*

A similar preparation to No. 42.42, dried and mounted in turpentine. The tubules are very well filled and the straight tubes in which they end can be traced into the network (rete testis) of the mediastinum. From the upper end of that the efferent vessels, five or six in number, are seen to rise. These become convoluted and form a number of conical masses of duct called coni vasculosi, which terminate in a single tube whose convolutions form the epididymis. This passes back to the lower end of the testis, whence it is continued as a convoluted tube with larger calibre and thicker walls called the vas deferens.

42. 46. Testicle injected with Mercury by the Vas Deferens. *Hunterian. Y. 33.*

Similar to the preceding, but only the beginning of the tubes filled. Dried and mounted in turpentine on black paper.

42. 47. Testicle injected with Mercury by the Vas Deferens. *Hunterian. Y. 33 (2).*

Similar to the preceding. Dried and in turpentine.

42. 48. Testicle injected with Mercury by the Vas Deferens.*Hunterian. Y. 34.*

Similar to the preceding. Dried and mounted in turpentine.

42. 49. Testicle injected with Mercury by the Vas Deferens.*Hunterian. Y. 35.*

A beautiful example of the same kind of preparation, mounted in turpentine on red paper. The epididymis is unravelled to a considerable extent. The vasa efferentia and coni vasculosi are well displayed. There are about a dozen of the former arranged in four bundles.

42. 50. Testicle injected with Mercury. Vasa Efferentia.*Hunterian. Y. 36.*

Similar to the preceding, on brown paper; in turpentine; the vasa efferentia to the number of twelve finely unravelled.

42. 51. Testicle injected with Mercury. Vasa Efferentia.*Hunterian. Y. 38.*

Similar to the preceding. In turpentine, on white paper.

42. 52. Testicle injected with Mercury. Vas Aberrans of the Epididymis.*Hunterian. Y. 40.*

Similar to the preceding, but with the epididymis "very much unravelled appearing like a single tube convoluted. One of the vascula aberrantia of Haller is seen terminating near the beginning of the vas deferens." The vas aberrans is a convoluted tube similar to the vas deferens in structure, and like it formed from the Wolffian duct of the foetus. On "blue" (now black) paper in turpentine.

42. 53. Vas Aberrans of the Epididymis. *Hunterian. Y. 46.*

A testicle partly injected with mercury, the epididymis not unravelled, showing the above in its natural position rising from the epididymis near to its lower end and passing up beside the vas deferens. Turpentine.

42.54. Vas Aberrans of the Epididymis. *Hunterian. Y. 47.*

Similar to the preceding. The vas aberrans is double and very long. In turpentine on blue paper.

42.55. Vas Aberrans of the Epididymis. *Hunterian. Y. 47a.*

Similar to the preceding. On blue paper in turpentine.

42.56. Vas Aberrans of the Epididymis. *Hunterian.*

A testicle treated in a similar manner, but insufficiently dried, showing a very long vas aberrans. In turpentine.

42.57. The Vasa Efferentia and Aberrant Tube of Kobelt.

Hunterian. Y. 51.

A testicle with the vas deferens injected with mercury. The vasa efferentia and coni vasculosi are well displayed, and beside them arises an aberrant tube ending in a little sac, also filled with mercury. The latter, which goes by the above name, is one of the tubes of the Wolffian body not utilized in the formation of the ducts of the testicle. Mounted in turpentine.

(c) *The Descent of the Testicles.*

The following eight specimens and three in the comparative anatomy division of the series, with possibly one or two which are not here, form the set of dissections with reference to which John Hunter wrote his paper "On the State of the Testis in the Foetus and on the Hernia Congenita." The paper, along with three plates, was published first in William Hunter's "Medical Commentaries" (pp. 71-89), and afterwards republished by John Hunter, "with some practical observations added," in the volume of essays on the "Animal Oeconomy," which forms Vol. IV. of Palmer's edition of his works. The specimens from which Plate I. was taken were readily identified; but as to that (or those) from which Plates II. and III. were drawn there is some doubt, there being none which corresponds exactly. For Congenital Hernia see Nos. 36.18 to 36.22.

42.58. Position of the Testicles in a "Foetus of 4 or 5 Months."*Hunterian. Y. 53.*

The head and the anterior parietes of the foetus have been removed. The intestines are raised up showing the testicles lying in the abdomen in the inner parts of the iliac fossae, "the size of very small peas."

42.59. Position of the Testicles in a Seven-Month Foetus.*Hunterian. Y. 54.*

The lower part of the trunk of a foetus, the anterior parietes, liver, spleen, and all of the alimentary canal but the rectum removed, showing the testicles lying close to the lower ends of the kidneys, the right covered with peritoneum and hanging into the peritoneal cavity by a fold called the mesorchium, analogous to the mesentery. The epididymis is seen to its outer side. The peritoneum has been dissected away to the left, without disturbing the position of the testicle, to show more clearly its relations and the vessels passing to it round the lower end of the kidney.

42.60. The Gubernaculum Testis of John Hunter in a Foetus of Seven Months.*Hunterian. Y. 55.*

The lower part of the trunk of a foetus, cut across the middle of the kidneys and all the bones carefully removed from behind to allow the preparation to be mounted flatter. Injected red by the arteries; the rectum, "distended with meconium," ligatured and cut short and the bladder opened. This is the specimen from which Plate I. in the *Medical Commentaries* was taken. The description and the outline diagram are therefore reproduced in full. The specimen was exceedingly dirty, and has not the clearness and colouring which it originally had; it and the description and diagram should be compared with the succeeding specimen, which, having been more completely dissected and better preserved, shows a number of points which are not now clearly visible in the original, indeed it appears not improbable that the right side of the plate was drawn from the latter.

The original description by John Hunter is as follows: "The first figure represents the testes within the abdomen, in an abortive foetus of about six months. All the intestines, except the rectum, are removed; and the peritoneum in most places is left upon the

surfaces which it covers, so that the parts have not that sharpness and distinct appearance which might have been given to them by dissection.

A. The upper part of the object, covered with a cloth.

BB. The thighs.

C. The penis.

D. The scrotum.

E. The flap of the integuments, abdominal muscles, and peritoneum turned back over the right os ilium to bring the testis into view.



F. The flap of the skin and cellular membrane of the left side disposed in the same manner.

G. The flap of the abdominal muscles and of the peritoneum of the left side turned back over the spine of the os ilium. The lower part of this flap is cut away in order to show the ligament of the testis passing down through the ring into the scrotum.

HH. The lower part of each kidney.

I. The projection formed by the lower vertebrae lumborum, and by the bifurcation of the aorta and vena cava.

K. The rectum filled with meconium, and tied at its upper part where the colon was cut away.

L. That branch of the inferior mesenteric artery which was going to the colon.

M. The lower branch of the same artery, which went down into the pelvis behind the rectum.

N. The lower part of the bladder, that part of it which is higher than the ossa pubis in so young a foetus being cut away.

OO. The hypogastric or umbilical arteries cut through, where they were turning up by the sides of the bladder in their way to the navel.

PP. The ureter of each side passing down before the psoas muscle and iliac vessels in its course to the lower part of the bladder.

QQ. The spermatic arteries running a little serpentine.

RR. The testes situated before the psoae muscles, a little higher than the inguina. In this figure the interior edge of the testis is turned a little outwards, to show the spermatic vessels coming forwards to the posterior edge of the testis, in the duplicature of the peritonaeum; which duplicature connects the testis, encloses its vessels, and gives it an external smooth coat, much after the same manner as the duplicature of the mesentery connects the intestine, conveys its vessels, and gives it a polished covering. The beginning of the epididymis is seen at the upper end of the testis, from which it runs down on the outside (and therefore in this view behind the body) of the testis.

SS. The vas deferens of each side passing across, in a serpentine course, from the extremity of the epididymis at the outside of the lower end of the testis, and then before the lower part of the ureter, in its way to the vesicula seminalis.

TT. What I have called the gubernacula or ligaments of the testes in a foetus. On the left side this ligament is entire, so that it is seen going down from the lower end of the testis, through the ring of the muscle into the scrotum; but on the right side its upper and fore part is cut away, that the continuity of the epididymis and vas deferens may be seen; and no more of the ligament is exhibited than what is situated within the cavity of the abdomen.

N.B.—The lower part of the ligament, as it is seen in the right side of this figure, lies so loose in the passage through the muscles, and is there so loosely covered by the peritonaeum, that, when the testis is pulled up, more of the ligament is seen within the

cavity of the abdomen, and then the peritoneum is made tight and smooth at that place; but, on the contrary, when the scrotum is pulled downwards, the lower part of the ligament is dragged some way down through the passage in the muscles, and the loose peritoneum is carried along with it; so that then there is a small elongation of that membrane, with an orifice from the cavity of the belly, like the mouth of a small hernial sac, on the forepart of the ligament."

42. 61. The Relations and Blood Supply of the Testicle, and the Gubernaculum of John Hunter. *Hunterian. Y. 53a.*

The lower part of the trunk of a somewhat smaller foetus, injected red by the arteries, blue by the veins, and the anterior parietes and all the viscera, except the descending colon, sigmoid flexure and rectum, and the genito-urinary organs, removed. Also the peritoneum carefully dissected off. It is very similar to the preceding, but better injected and more fully dissected. The testicles are seen, as in the preceding, at the lower end of the kidneys, the left overlapped by the sigmoid flexure. The right side, which is very beautifully dissected, shows a number of points figured in the plate taken from the preceding more clearly than does the original; it should be compared with it and with the line diagram. The description of the preceding in the main applies to this; that part dealing with the right side in particular, applies better to this, which suggests that this specimen was used to assist the artist in the preparation of the plate. In the preceding the gubernaculum is entire on the right side, in this "its upper and fore part is cut away, that the continuity of the epididymis and vas deferens may be seen," and the course of the spermatic artery. The vas deferens, rising from the lower end of the epididymis, runs direct to the back of the bladder. Comparison of the position and relations of the testicle in this specimen with the position in the adult explains at once the origin of the spermatic vessels from so high a point as the renal artery and the peculiar course of the epididymis and vas deferens.

42. 62. The Testicles "Recently Descended" from a somewhat Older Foetus. *Hunterian. Y. 58.*

The lower part of the trunk of a foetus, everything behind the acetabula, and in front, above a line from the anterior superior

iliac spine to the umbilicus, and the thighs cut away; the remainder of the abdominal walls and the scrotum carefully dissected, showing the condition depicted in Plate II., which may have been taken from this dissection, the view of the upper part of the right processus vaginalis and the viscera being added from some other specimen not now in the collection. The penis and the central portion of the scrotum remain, and on either side the processus vaginalis of the peritoneum is dissected up to the external ring. On the right a strip has been cut out of it and turned up on the abdomen, revealing the testicle and epididymis and the ridge of the spermatic vessels projecting into its cavity. Two bent bristles are passed up into the abdominal cavity.

“*N.B.*—The peritoneum lies before the spermatic vessels and vas deferens, or covers them within the abdomen, and its process or elongation covers them in the same manner all the way from the abdominal muscles downwards, so that if the intestine slips down after the testis in a foetus it must be placed before the spermatic vessels and vas deferens.”

On the left it is seen as if “a little distended with air or water poured into it from the cavity of the abdomen.” Behind are seen the rectum turned down and the bladder nearly empty, its apex stretching up on the abdominal wall, attached to the umbilicus by the urachus and the umbilical arteries on either side, and a little external to these the orifices of the processus vaginales not yet closed (the ends of the bristles showing in the right one).

“It is evident that part of the peritoneum, which, in this figure, is carried down in the form of a hernial sac to a little below the testis, lies before the testis, epididymis, spermatic vessels, and vas deferens, and that it covers those parts in the same manner as it covers the abdominal viscera, viz., the posterior part of the sac (supposing the sac to be cut lengthways into two halves) is united with them and gives them a smooth surface, while the anterior half of the sac lies loose before them, and may be removed to some distance from them, as when the sac is distended with water.” Compare No. 42.65.

42.63. The Testicles in a Foetus “about Seven Months.”
The Left outside and the Right inside the
Abdomen.

Hunterian. Y. 56a.

Lower part of the trunk as in No. 42.60, with part of the

thighs, finely injected red, the rectum and bladder cut at the brim of the pelvis, showing the above. The spermatic vessels are very well shown on both sides. The right testicle is just below the kidney as in No. 42.59. The left, its tunica vaginalis dissected away, lies just outside the external abdominal ring beside and rather above the penis. A bristle is passed through the neck of the processus vaginalis.

42. 64. The Processus Vaginales of "a Foetus at 8 Months."

Hunterian. Y. 59.

The bladder, the umbilical arteries (the urachus lying between them), and the processus vaginales "taken out of the body of a foetus at 8 months, but *in situ* nearly." The bladder is cut open from before and bristles placed in the ureters, and on both sides the tunica vaginalis is opened at the bottom to show the testicles down. The upper part of the processus, still unclosed, is held open by bristles.

42. 65. The Testicles in the Scrotum. Processus Vaginales Obliterated.

Hunterian. Y. 60.

A similar preparation to No. 42.62, showing the testicles in the scrotum carefully dissected, and the tunica vaginalis opened on both sides. From behind is seen, at either side of the bladder, a little pit in the peritoneal lining of the abdominal wall, which shows where the testicles and the processus passed; there is now no passage there, obliteration being complete. The age of the subject is not recorded; apparently a full-grown foetus.

42. 66. The Testicles Descended abnormally Early.

Hunterian. Y. 60a.

A similar preparation from a very young foetus, showing the testicles already down. The age of the foetus is not recorded. It shows that the time of the descent is very variable. The peritoneal processes are still open. Only the right side is dissected.

(d) Anatomy of the Penis.

42. 67. A Penis in the Erect Condition. *Hunterian. BB. 1.*

"The penis of a man from the dissecting room, of a prodigious

size ; the corpora cavernosa and spongiosum are injected green to show its shape ; six and a half inches long." The organ seems to be rather over-distended, and its thickness is very much exaggerated by the round jar. The scrotum has been removed with it, and sewn up around the ends of the corpora cavernosa.

42.68. A Penis in the Erect Condition. *Hunterian. BB. 1a.*

A similar specimen "of the same size nearly as the preceding."

42.69. A Penis in the Erect Condition. *Hunterian. BB. 2.*

Another penis, cut off at the front of the scrotum after distension with green injection, to show its shape. About six inches long (15·7 cm.).

42.70. The Erectile Bodies of the Penis. *Hunterian. BB. 3.*

A penis (hanging point downwards), over-distended with injection, removed entire from the body, and partly dissected. It is seen to be composed of two large masses of erectile tissue called corpora cavernosa, which are attached to either ramus of the pubic arch and a third—the corpus spongiosum urethrae—which is set below and between them. The corpus spongiosum is expanded anteriorly to form the glans penis. See succeeding specimens.

42.71. The Erectile Bodies of the Penis. *Hunterian. BB. 4.*

A penis injected, the corpora cavernosa red, the corpus spongiosum and glans penis with mercury ; mounted dry showing the above.

42.72. The Glans Penis.

Hunterian. BB. 42.

The anterior portion of a penis distended with red injection, and the prepuce drawn back showing the above. At the point is seen the orifice of the urethra—meatus urinarius—beneath which the glans is grooved by a fold of skin stretching back to the prepuce called the frenum. The base of the glans forms a rounded collar, overlapping the ends of the corpora cavernosa. The constriction behind it is called the cervix or neck of the penis.

42.73. The Glans Penis and Prepuce. *Hunterian. BB. 43.*

A similar preparation, but with the prepuce not so much drawn back, appearing as a fold of skin just behind the glans. From its weight the specimen appears to be injected with mercury.

42.74. The Prepuce and the Vascular Tactile Papillae of the Glans Penis. *Hunterian. BB. 44.*

The glans penis injected red from the arteries. From its surface project numerous vascular and nervous papillae. These are seen more distinctly in the succeeding specimen. At the sides the prepuce is seen in section as a fold of skin with loose areolar tissue between. Its outer surface appears to be ordinary skin, its inner is more like mucous membrane.

42.75. The Vascular Tactile Papillae of the Glans Penis. *Hunterian. BB. 44a.*

A glans penis, beautifully injected red by the arteries, the prepuce drawn back showing the above all round the corona glandis. From the fineness of the injection the whole specimen is of a bright crimson colour. The epidermis has been removed, the better to show the vascularity of the parts, and to allow the papillae to stand out distinctly. A beautiful specimen.

42.76. The Skin and Subcutaneous Connective Tissue of the Penis and Scrotum. *Hunterian. BB. 48a.*

A penis in the flaccid condition with half of the scrotum, prepared to show the above. The areolar tissue has been inflated in some manner, and the skin then raised from the side of the penis, and the scrotum divided in the middle line. Shows the loose mobile areolar tissue which envelopes the firm structures of the penis and the testicles, and allows free movement between them and the skin.

42.77. Transverse Section of the Penis. *Hunterian. BB. 10.*

A section about the middle of the penis, to show the thickness of the integuments, the cavernous substance of the corpora cavernosa and corpus spongiosum urethrae, the urethra (with a double

bristle in it), flattened dorso-ventrally, the central arteries of the corpora cavernosa and dorsal vein (also with bristles in them), and the thickness of the strong white fibrous sheath of the corpora cavernosa and septum between them.

42.78. Transverse Section of the Corpora Cavernosa.

Hunterian. BB. 11.

A similar section from a penis injected black by the veins. The black corresponds to the blood spaces of the erectile tissues of the organ. The arteries, trabeculae, septum, and sheaths being white, show well by contrast. The central artery of each corpus cavernosum is readily distinguishable.

42.79. Trabeculae of the Corpora Cavernosa.

Hunterian. BB. 18.

“The corpora cavernosa having been injected red, the cavernous substance is mostly dug out, to show ligamentous frena passing from the sides of the cavernosa, to prevent their being irregularly distended or beyond their capacity.”

42.80. The Corpora Cavernosa, Dorsal Artery, Dorsal Vein, and Nerves of the Penis.

Hunterian. BB. 39.

The corpora cavernosa injected black by the veins, and one side afterwards cut out to show the spaces and the strong transverse trabeculae and finer irregular fibrous network, which make up the erectile tissue. The dorsal artery is injected red, and the nerves are visible as pale yellow streaks running along the dorsum external to the artery and curving round to the lower side. Compare No. 42.82.

42.81. The Septum Pectiniforme of the Corpora Cavernosa.

Hunterian. BB. 39a.

“The corpora cavernosa injected black: on the right side the injection is dug out next the crura, showing a complete tendinous septum; on the left side it is dug out next the glans, showing the injection passing through the slits of communication.”

42.82. The Nerves of the Penis and the Corpus Spongiosum and Glans Penis.*Hunterian. BB. 33.*

A penis injected with mercury by the veins so as to distend the whole of the erectile tissues, the integuments removed, dried, and then one half of the glans and end of the right corpus cavernosum cut away, allowing the mercury in part to escape. Shows the continuity of the glans with the corpus spongiosum urethrae, and the manner in which the corpora cavernosa fit into and are attached to it. The dorsal nerves are also seen, as in No. 42.80, running external to the dorsal artery, branching and curving round the sides of the organ. The piece cut out is suspended above the rest of the specimen. Also shows the shape of the urethra—a vertical slit-like orifice widening out into a deeper vertical sinus in the glandular portion, which changes into a horizontally flattened tube as it passes below the rounded end of the corpora cavernosa into the corpus spongiosum.

42.83. The Relation of the Corpora Cavernosa to the Glans Penis.*Hunterian. BB. 28.*

A longitudinal section of the end of a penis which had previously been washed out, partly distended with spirit and hardened. The section passes above the urethra, and shows the manner in which the corpora cavernosa fit into the base of the glans. Shows also the prepuce in section.

42.84. The Arteries and Cavernous Tissues of the Penis.*Hunterian. BB. 19.*

"The corpora cavernosa dried by quicksilver injection, after having been injected red by the arteries," the sides then cut out and the mercury allowed to escape, so that the cavernous tissue remains with its spaces greatly exaggerated. Compare the preceding and No. 42.77. The dorsal arteries, and the central arteries of the corpora cavernosa with their branches running in the trabeculae, are very beautifully displayed. Mounted in turpentine.

42.85. The Arteries and Cavernous Tissues of the Penis.*Hunterian. BB. 20.*

One half of the anterior part of a penis treated in a similar

way, but the integuments not removed; showing the same points and also the continuity of the corpus spongiosum urethrae and the glans. In turpentine.

42. 86. The Arteries and Cavernous Tissues of the Penis.

Hunterian. BB. 23.

The other half of the preceding, mounted in turpentine.

42. 87. The Arteries and Cavernous Tissues of the Penis.

Hunterian. BB. 21.

"A very large penis, in which the arteries had been injected red, dried in the manner of the last, and cut open on one side, to show the corpus cavernosum, and that the spongiosum urethrae and glans are continued into one another." Mounted in turpentine. A beautiful specimen.

42. 88. The Veins of the Penis.

Hunterian. BB. 24.

The corpus spongiosum and glans, and the corpora cavernosa, for three or four inches, filled with mercury by the veins, dried, and mounted in turpentine. Numerous large veins are seen in the sulcus between the great erectile masses and running round the sides of them to end in the dorsal vein.

42. 89. The Veins of the Glans Penis.

Hunterian. BB. 25.

A glans penis, distended with mercury injected from the veins. The cavernous tissues are composed of irregular venous spaces, but from this specimen it appears that in the external parts of the spongiosum "there are really vessels similar to veins."

42. 90. The Glans Penis and Anterior Third of the Urethra.

Hunterian. BB. 29.

"A section through the upper (anterior) end of the penis, after the cavernosum and spongiosum had been filled with spirits and hardened, to show that the glans and spongiosum are different from the cavernosa." Showing also the change in the shape of the urethra, which from the bulb to within about 2 cm. of the

meatus is flattened dorso-ventrally, but in the glans becomes narrowed laterally and greatly expanded vertically, corresponding to the vertical slit-like meatus urinarius. Compare No. 42.83.

42.91. The Penile Part of the Urethra. *Hunterian. BB. 32.*

The corpus spongiosum for about four inches and the glans penis, slit from below, showing the above laid open.

42.92. The Lacunae of the Urethra. *Hunterian. BB. 66.*

The urethra, with the corpus spongiosum and glans penis slit open from below, showing bristles placed in a large number of the above. They are ducts of mucous glands; they all point towards the meatus urinarius. It is possible that one of these, if enlarged by disease, might catch the point of a fine bougie or catheter.

42.93. The Lacuna Magna of the Urethra.

Hunterian. BB. 36.

The anterior portion of the urethra, opened from below, showing a large lacuna in its roof, about a quarter of an inch within the meatus, in the upper part of the wide vertical portion of the canal corresponding to the glans penis. Compare No. 42.83.

42.94. The Lacuna Magna of the Urethra.

Hunterian. BB. 38.

Similar to the preceding. The lacuna is much larger. It was injected with mercury, which has stained the interior of the canal black.

Comparative Anatomy of the Testicle.

42.95. Testicle of Goat.

Hunterian. Y. 15.

The vas deferens and veins injected with mercury, showing the convolutions of the epididymis and the ramifications of the veins in the tunica albuginea.

42. 96. Testicle of Elephant. *Hunterian. Y. 43.*

One half of the above. It is by no means large for the size of the animal; about four times the size of that of the goat.

42. 97. Testicle of Porpoise. *Hunterian. Y. 45.*

The albuginea is dissected off one side, and the epididymis partly unravelled. It is rather larger than that of the elephant.

42. 98. The Spermatic Artery of a Bull. *Hunterian. Y. 7.*

"A portion of the spermatic artery of a bull, almost as large in diameter as a goose quill, and convoluted in such a way, that were this piece, which is not more than three inches in length, unravelled, it would measure ten or twelve feet." Injected with mercury and mounted in turpentine.

Comparative Anatomy of the Descent of the Testicles.

42. 99. The Testis and Gubernaculum in a Foetal Dog.

Hunterian. Y. 59a.

Lower part of the trunk of a dog, all the viscera removed, to show the testicles undescended, lying upon the psoae muscles with their gubernacula below them. Compare Nos. 42.58-42.66.

42. 100. The Testis and Gubernaculum in a Foetal Lamb.

Hunterian. Y. 59b.

Similar to the preceding. Injected, "red by the umbilical vein."

42. 101. The Testis and Gubernaculum in a Foetal Calf.

Hunterian. Y. 59c.

Similar to the preceding.

*Development of the Testicles in Animals at the
Breeding Season.*

42. 102. The Testicles in a Sparrow "Two Months Old."

Hunterian. Y. 74.

A young sparrow, hanging by the legs, feathers not removed;

the anterior parietes of thorax and abdomen and most of the viscera removed, to show "The testicles, of the size of small pin's heads, just before the kidneys at their upper end." This and the next two (or similar) specimens are referred to by John Hunter in his paper "On the Glands called Vesiculæ Seminales" (*Animal Oeconomy*, Vol. IV. of Palmer's edition, p. 28), as follows: "Animals have their natural feelings raised or increased according to the perfection of the parts connected with such feelings. But, that these feelings may be duly excited, it is necessary that the animal and the parts should be healthy, in good condition, and a certain degree of warmth suitable to that class to which the animal belongs. In the greatest part of the globe there is a difference in the warmth of the same district at different periods, constituting the seasons; and the cold in some of them is so considerable as to prevent these feelings or dispositions in animals from taking place, and to render them, for the time, unfit for the purposes of generation. This is owing to the testicles becoming at this season small, and being therefore unfit to give such dispositions, as is the case in very young animals. This fact is very obvious in birds, of which the sparrow may be produced as a proof. For if a cock sparrow is killed in the winter, before the days have begun to lengthen, the testicle will be found very small; but if that organ is examined at different times in other sparrows as the warmth of the weather increases, and if this examination is continued into the breeding season, the difference in the size of the testicles will be very striking. This circumstance is not peculiar to birds, but is common, as far as I know, to all animals which have their seasons of copulation." See next two specimens.

42.103. The Testicles in an "Old Sparrow in Winter."

Hunterian. Y. 75.

A similar preparation. The testicles are very little larger than in the young one.

42.104. The Testicles in an "Old Sparrow in April."

Hunterian. Y. 76.

"The testicles are now about the size of a sparrow's egg, that is, two or three hundred times larger than they were in winter." They are rather larger than the heart, which is seen just in

front of them, and occupy no inconsiderable part of the cavity of the trunk.

42.105. The Testicles and Vesiculae Seminales in a Mouse.

Hunterian. Z. 8.

A mouse opened (the abdominal viscera, except the kidneys, removed) to show the testicles, which are situated in the abdomen. They are very large in proportion to the size of the animal. The vesiculae seminales, also very large, are seen on either side, about the same size as the testicles.

42.106. The Testicles and Vesiculae Seminales in a Mouse.

Hunterian.

Similar to the preceding.

Comparative Anatomy of the Penis.

42.107. Transverse Section of the Penis. Horse.

Hunterian. BB. 41a.

In structure it resembles the human penis. It is not distended to any great extent. The septum between the two corpora cavernosa is very indistinct, so that there appears to be only one. The outer sheath is very thick. A number of strong white ligamentous cords pass from the bottom of the sheath to the sides, the function of which is to maintain the shape of the organ. It is flattened laterally.

42.108. Transverse Section of the Penis. Horse.

Hunterian. BB. 41b.

Similar to the preceding.

42.109. Transverse Section of the Penis. Horse.

Hunterian. BB. 41c.

A similar section near the end of the corpus cavernosum and including part of the glans, which overlaps the corpus cavernosum on the upper surface.

42. 110. Penis of Dog.*Hunterian. BB. 24a.*

Injected by the veins with mercury. "The glans and a round swelling an inch below, which locks the dog in the coitus, are seen turgid with mercury." Dried and in turpentine.

42. 111. Penis of Antelope.*Hunterian. BB. —.*

Injected with mercury, dried, and mounted in turpentine. It is very long, thin, and sharp pointed, and is compressed laterally like that of the horse. The external veins are very large.

SERIES 43.

INJURIES AND DISEASES OF THE BLADDER AND MALE GENITAL ORGANS.

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I. CONGENITAL DEFECTS AND MALFORMATIONS.

(a) *Of the Bladder.*

43.1. Extroversion of the Bladder. *Hunterian. AA. 37a.*

"The kidneys, ureters, posterior part of the bladder and kind of glans penis, from a boy. The parietes of the abdomen about the pubis and the pubis itself were wanting; the anterior part of the

bladder was also wanting, and the posterior part presented itself in place of the external integuments; it was inflamed, and a little concave; the orifices of the two ureters appear, and the urine flowed perpetually either in small gushes or drop by drop; on the upper side of the glans penis appeared the orifices of the vasa deferentia with the large lacuna between. The vesiculæ seminales are seen behind, and most of these circumstances are pointed out by bristles." The umbilical arteries, running up over the back of the bladder, are also indicated by bristles. The umbilicus is not seen in the specimen.

43.2. Congenital Distension of the Urinary Bladder; Sacculation of the Ureters; Cystic Kidneys.

Hunterian. AA. 31.

"The lumbar vertebrae and pelvis of a child at birth; the lower part of the left ureter is dilated into a bag, very nearly as large as the bladder itself; the same disposition seems to be taking place in the lower end of the other ureter; both kidneys are shrunk almost to the size of kidney beans; the left was even beginning to take on the hydatid appearance on its outside; the arteries are injected red." The aorta, bladder, ureters, and kidneys are carefully dissected. The bladder is of elongated shape, and rises well above the pubis, as is usual in infants, and it is considerably distended; the ureters enter it above the level of the brim of the pelvis. A bristle in the urethra shows that this passage is patent. The left ureter shows three globular dilatations, the lowermost, close to the bladder, being almost as large as the bladder itself, and its walls are of fair thickness considering the size of the subject—not much thinner than those of the bladder. There is no obstruction of the orifice of the ureter, a bristle placed in it being freely movable. There is another bristle between the lowest and middle pouches, and the middle and upper communicate freely. There is a fourth small dilatation above this, and the rest of the ureter is contorted but not dilated. The left kidney is smaller than normal, and is cystic to a very considerable extent. The right ureter presents a small dilatation close to the bladder; its orifice is visible but has no bristle in it, and an attempt to pass one (for fear of injuring the specimen not very determined) was unsuccessful. The rest of the ureter is normal in thickness and less convoluted than the left. The right kidney is very small, not much larger than a pea, and solid,

but one cyst was found in it, showing the same tendency as the other. The other viscera have been removed.

43.3. Double Ureter.

Hunterian. AA. 11.

"A portion of the bladder; two ureters are seen opening on the right side, two bristles are introduced; two other bristles show the openings of the vesiculæ seminales and vasa deferentia." Compare Series 40, Diseases of the Kidneys, Nos. 3-5.

43.4. Bilateral Doubling of the Ureters.

Hunterian. AA. 11a.

"Posterior half of a male bladder with double ureters on each side."

(b) *Malformations of the Penis and Testicles.*

43.5. The Penis and Perinaeum of a Cryptorchis.

Hunterian. BB. 52a.

"The penis, anus, and perinaeum of a boy of 19 who died in the Westminster Hospital," whose "testicles had never been down" into the scrotum. The penis is well developed, and the portion of the pubic skin which remains and the perinaeum are covered with a strong growth of black hairs, but there is no scrotum; only a laxity of the skin on either side of the median raphe about the root of the penis. There is no account of the state of the sexual functions in the boy.

43.6. Malformation of the Meatus Urinarius.

Hunterian. BB. 47.

"A penis showing the orifice of the urethra opening not in the apex of the glans, but in the place of the frenum on the under side."

II. INJURIES AND OPERATION WOUNDS OF THE GENITAL ORGANS AND BLADDER.

43.7. Incision in the Urethra and Neck of the Bladder in Lateral Lithotomy.

Hunterian. AA. 26.

"A portion of the bladder, prostate gland, and urethra, on

which the operation of the stone was performed with the cutting gorget; the parts cut are the bulb of the urethra, to the left Cowper's gland, the prostate sideways, and about half an inch of the bladder itself; the thickness of the prostate sufficiently defends the vesiculæ seminales below; bristles show their orifices, and the knife has passed within one sixteenth of an inch of them to the left: section made on the dead body, with a view to show exactly the parts cut."

43.8. Lateral Lithotomy Wound. *Hunterian. AA. 26a (b ?).*

"The whole of the parts concerned in lithotomy, cut by gorget composed from the blunt one and the blade of Dr. Hunter's knife; the objection to other cutting instruments was that they did not cut enough, or that the forceps could not be conveniently conveyed along them. A very large flint was conveyed into the bladder at its fundus, and extracted as in lithotomy, without laceration or wounding any important part; the caput gallinaginis, rectum, and vesiculæ seminales untouched: the external as well as the internal parts are preserved." The fat of the ischio-rectal space has been dissected away to show the position of the rectum. The wound is very extensive; the left lobe of the prostate gland is completely divided.

43.9. The Perinaeum and Neck of the Bladder showing Cicatrix of Lithotomy Wound. Fistula into the Rectum. *Hunterian. AA. 27.*

"The same parts with the rectum opened in a boy who died in St. George's Hospital; he was formerly cut for the stone, and the cicatrix is seen externally: in the operation the point of the staff had got out of the orifice of the bladder, and the gorget had been pushed through above the natural passage; the rectum had also been injured; the natural passage is pointed out by a bristle, which, at its anterior end, points also to a little fistulous orifice, by which the urine got into the rectum, producing purging, etc.: the boy had the stone again, was to have been cut, but died."

43.10. Cicatrix of Lithotomy Wound. Fistula into the Rectum. *Hunterian. AA. 27c.*

"The parts concerned in lithotomy: they seem to be from a

boy, and it appears he had been cut for the stone from the large external cicatrix; there is also a fistulous orifice between bladder and rectum." The cicatrix is that of a lateral perinaeal incision. Internally the urethra is seen healed towards the outside, but, as mentioned above, communicating by a fistulous orifice with the rectum.

43.11. Rupture of the Bladder from Overdistension.

Hunterian. AA. 49.

The bladder of a woman, hardened in a position of moderate distension and the base cut away, showing on the apex a slit-like rent about 1 cm. in length. The peritoneum around it is covered with a thin coat of fibrinous exudation. The specimen was described in the old catalogue as "ruptured bladder (from a patient of Mr. Hey, of Leeds)," and it appears to correspond to a case described in the fourth volume of *Med. Obs. and Inq.*, p. 58, under the title, "An Account of a Rupture of the Bladder from a Suppression of Urine in a Pregnant Woman, by Mr. Hey, Surgeon at Leeds, communicated by W. Hunter, M.D., F.R.S.," of which the following is a resumé:

The patient was a primipara, aged 38. Dr. Hey was called to see her, first, on the third day from the commencement of the labour. The presentation was cranial occipito-anterior, and the head low down in the pelvis. A dead child was born on the following day by natural means. Five days later he was again called in consultation, when he found her presenting the signs and symptoms of peritonitis. She died four days later, and on section the ruptured bladder was discovered. After this, inquiries were made of the midwife, and it was found that the patient when first seen had passed no urine for two days, and she was noticed to be unduly swelled about the abdomen. The midwife "assured me, that although she had discharged no urine with a stream during the time mentioned, yet that it was continually flowing from her upon the clothes; and that she did not complain of any motion to make water"—a typical history of the condition of distension with overflow. The dribbling had continued after delivery, and, three days after it, while raising herself, patient had felt something "crack (as she expressed it) at her navel, and the pain immediately became severe about that part." She then ceased to pass any urine. Catheter passed thirty hours later brought away six ounces of bloody urine. No more

urine was removed after this. She died in three days, and on sectio the abdomen was found full of urine, which had escaped by a rent "in the superior part of the bladder, large enough to admit the introduction of a finger. The edges of this aperture were jagged and of a blackish colour; the rest of the bladder appeared to be sound. "In general, the intestines and their appendages had a very sound appearance." The uterus also "appeared to be in a sound state, and sufficiently contracted considering that the woman died on the ninth day after delivery." The amount of urine in the abdomen was fourteen pints.

43.12. Urinary Fistula into the Rectum due to a Large Calculus in the Membranous Part of the Urethra. Dilatation of the Ureters and Bladder.

Hunterian. AA. 41.

"The bladder and rectum of Colonel —; he was cut for the stone by Mr. Hawkins, and died a few days after the operation. He determined at last to submit to the operation because he was miserable; for besides the ordinary complaints, his urine had made a passage into the rectum, which from time to time had all the effects of a sharp clyster. He could hardly venture abroad, and at home was from that urgency always without breeches. On passing the finger within the sphincter ani, the large bag of stones was distinctly felt; they were covered by a thin membrane only; and on the most prominent part the point of the finger felt the fistulous hole where the urine passed, and where the stones were bare. The quill is in that orifice. On the fore part is seen the cavity of the bladder, with quills in the dilated ureters; below which is the urethra laid open, where it passes through the prostate, with a bristle in a seminal duct; and below that again the cavity of the bag which contained the stones, which in reality were in the dilated membranous part of the urethra."

43.13. Fistula between the Urethra and the Rectum. Calculus.

Hunterian. AA. 37.

The bladder, injected red and inverted, "from a man who had the stone." It shows hypertrophy of the muscular wall, and roughening of the mucous membrane due to cystitis, marked dilatation of the ureters, and a fistulous communication with the

rectum from the membranous portion of the urethra; the last marked with a piece of wood. Seems to be very similar to the preceding.

43.14. Enormous Dilatation of the Bulb of the Urethra, which formerly contained a Calculus. Perineal Fistula. *Hunterian. BB. 65.*

"The lower portion of the bladder, opened from before, the lower portion of the penis also; the bulb of the urethra is opened; it contained a stone very nearly as large as a hen's egg; there was a fistulous orifice from it in perinaeo: from an old man in the dissecting room." Referred to in Matthew Baillie's *Morbid Anatomy*, p. 312.

III. CHANGES DUE TO CONDITIONS, LOCAL AND GENERAL,
AFFECTING NUTRITION.

Hypertrophy of the Prostate Gland, and Morbid Conditions resulting therefrom.

43.15. Enlarged Prostate. Hypertrophy and Dilatation of the Bladder. *Hunterian. AA. 47.*

A bladder distended and hardened with spirit, cut open in front, showing the above conditions. Though the bladder is distended to far above the normal size, its wall appears nearly 1 cm. thick—a very considerable degree of hypertrophy. It is also fasciculated, the thickened strands of muscle standing out like pillars with pouches of mucous membrane protruded between them. The prostate is not markedly enlarged as a whole, but the middle lobe sticks up prominently, producing a sharp bend in the urethra, and also projects into the bladder creating behind itself the characteristic deep pocket in the region of the trigone, which the bladder is unable to empty, and in which the so-called residual urine stagnates.

43.16. Hypertrophied and Fasciculated Bladder. Stricture of the Urethra. *Hunterian. AA. 34a.*

"A very thick fasciculated bladder (turned inside out) from stricture of the urethra. (Dissecting room.)"

43.17. Hypertrophied, Fasciculated, and Sacculated Bladder. *Hunterian. AA. 34b.*

A similar bladder, showing also three distinct globular saccules "formed by the pushing out of the internal membrane between the fasciculi; these pouches might contain two drachms (they measure from two to three centimetres in diameter), each of their orifices easily admits a large pea; the stagnating of the urine in these pouches may possibly contribute to the foetor of the urine in patients with stricture." Compare next specimen.

43.18. Hypertrophy of the Middle Lobe of the Prostate Gland. Hypertrophy and Sacculation of the Bladder. Calculi in the Pouches. *Hunterian. AA. 35.*

"A very large thickened bladder opened (from before); the posterior part of the prostate, swelling into the bladder, forms an eminence behind the caput gallinaginis, which often prevents the introduction of the catheter; the inner coat is formed into pouches in which are seen white stones to the number of fifteen or twenty, some of these as large as a small gooseberry." The calculi have fallen out of several of the pouches. The specimen is figured in Matthew Baillie's *Engravings*, Fasc. VII., Pl. II., fig. 2.

43.19. Sacculation of the Bladder. *Hunterian. AA. 36a.*

A portion of a hypertrophied and fasciculated bladder, showing numerous small pouches, which might have given lodgment to small calculi.

43.20. Sacculation of the Bladder. *Hunterian. AA. 36b.*

A portion of a bladder showing three saccules similar to the preceding. Figured in Matthew Baillie's *Engravings*, Fasc. VII., Pl. II., fig. 3; in the text to the illustration it states that they had contained calculi.

43.21. Hypertrophy of the Prostate Gland. Prominence of the Middle Lobe. Distortion of the Urethra. Hypertrophy and Fasciculation of the Bladder. *Hunterian. AA. 34.*

A bladder with the penis, laid open from before, showing the

above. The veins about the neck of the bladder are injected with mercury; they form a rich plexus under the mucous membrane.

43.22. Hypertrophy of the Prostate Gland. Prominence of the Middle Lobe. Marked Distortion of the Urethra.

Hunterian. AA. 39.

"A very large scirrous prostate gland, with the bladder cut open, from an old gentleman at Hammersmith, who died after much suffering from difficulty and suppression of water, with much irritation. It was very difficult to pass the catheter, and no urine was discharged till the point of the instrument was passed up almost above the os pubis; and the enlargement of the prostate (consequently the nature of the case), was certainly known by the examination per anum. There was a stone in the bladder bigger than an almond, the bladder was fasciculated, and a process of the enlarged prostate, at the beginning of the urethra, made a valvular operculum, the principal cause of suppression." The whole prostate is much enlarged. The middle lobe projects strongly, and the right lobe is more hypertrophied than the left, adding to the tortuosity of the urethra. The term suppression is here used with the meaning of retention; see under No. 41.48. The specimen is figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. III., fig. 1.

43.23. Greatly Hypertrophied Prostate Gland. Prominence of the Middle Lobe. Obstruction of the Urethra.

Hunterian. AA. 39a.

Prostate gland with part of the dilated and hypertrophied bladder, showing the above. Two sides of the prostate have been cut to show the organ in section. One of these surfaces is figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. III., fig. 3, as "scirrhous enlargement of the prostate gland," but "not exactly of the same nature with that kind of scirrhus which terminates in cancer."

43.24. Enormously Hypertrophied Prostate Gland and Bladder; Perforation of the Bladder; Extravasation of Urine and Abscesses in the Pelvic Cellular Tissue; Fistula between Urethra and Rectum.

Hunterian. AA. 36c.

The prostate and bladder, hardened, and opened from before.

The hypertrophy affects the whole gland, but principally the middle and left lobes, both of which project very strongly into the bladder. The urethra is very tortuous. The bladder is very much fasciculated, and it is through some of the pouches behind that the extravasation has occurred, producing extensive abscesses over the back of the organ.

43.25. Prostatic Calculi.

Hunterian. AA. 28.

A portion of the bladder, prostate gland, and urethra, showing a number of round brown stones embedded in the prostate about the sides of the caput gallinaginis. They are "naked towards the urethra, and surrounded by a ragged ulcerated surface. These probably would give the stroke to the sound on searching, and would be mistaken for stone in the bladder." Compare next specimen. The back part of the prostate is dissected to show a number of similar calculi embedded in its substance.

43.26. Prostatic Calculi.

Hunterian. AA. 29.

A prostate gland, with the neck of the bladder, showing a number of rounded brown calculi, about the size of hemp seeds, lodged by the sides of the caput gallinaginis. These might have given the stroke to the sound in searching and led to an erroneous diagnosis of stone in the bladder; William Hunter mentions in his lectures that he was once misled in this way himself. Compare preceding specimen. This specimen is figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. II., fig. 2.

IV. CHANGES DUE TO INFLAMMATORY DISEASES OF THE
BLADDER AND GENITAL ORGANS.

**43.27. Abscesses in a Hypertrophied Prostate Gland,
apparently connected with Lithotomy.**

Hunterian. AA. 39aa.

"A portion of bladder with a diseased prostate gland, very thick; there is some appearance of the patient having been cut for the stone; and there must have been abscess on the under side of the prostate, as here is a large cavity with a rough surface, which has been opened. (Falconar's sale.)" The hole in the prostatic portion

of the urethra looks like a lithotomy wound; beneath this is the abscess, which extends backwards and upwards, occupying the whole cavity of the capsule of the prostate gland, which is greatly thickened and lined with granulations. The abscess is also opened from the perinaeum. The specimen was examined microscopically, but without gaining any information, the tissues being too much altered through time. (MS. Notes, J.H.T., p. 130.)

43.28. Acute Cystitis and Urethritis. Sloughing of the Mucous Membrane. Deposit of Earthy Phosphates. *Hunterian. AA. 40.*

A portion of bladder, prostate and urethra laid open. "From a dead body in the dissecting room; case unknown; the bladder had sloughed, and on the surface is deposited a crust of animal earth." There has been a very violent inflammation involving bladder and urethra; the mucous membrane is gorged with blood and its inner surface is in a sloughing condition. Probably a septic cystitis. (MS. Notes, J.H.T., p. 112.)

43.29. Cystitis. Contracted Ulcerated Bladder. Abscesses. Urinary Fistulae opening in the Perinaeum and at the Umbilicus. *Hunterian. BB. 44.*

"An extremely ulcerated bladder from a subject in the dissecting room; its size is small, having never been much distended probably for years past; there is a fistulous orifice just before the caput gallinaginis leading to perineum; at the upper part of the bladder the ulceration had gone through to the peritoneal coat and formed an abscess, which was guided by the ligamentous urachus to the navel, where it opened externally; so that matter was discharged, and probably urine also, both at the navel and perineum."

43.30. Cystitis in a Hypertrophied Bladder.

Hunterian. AA. 33.

"A portion of (Hocquet's) bladder; amongst other symptoms he had great pain in making water, with scalding; sometimes the urine appeared like pus, at other times bloody; the muscular fibres are collected in bundles, much enlarged, but deprived almost entirely of their covering, the inner coat of the bladder being destroyed;

the vesicula seminalis of the left side was full of a brown fluid, though the testicle had been removed some months before." See No. 43.62. Carcinoma of the Testicle.

43.31. Ulcers of the Bladder.

Hunterian. AA. 46.

"The posterior portion of a female bladder, showing in two places the appearance of sloughing. In one place there is a little hole from ulceration, pointed out by a bristle, where the urine must have passed out into the cavity of the abdomen."

Stricture of the Urethra and its Complications.

43.32. Extensive Stricture in the Penile Portion of the Urethra.

Hunterian. BB. 56.

A penis, the corpora cavernosa overdistended with injection, with the urethra opened below. "For about two inches from the beginning, the urethra appears large and sound, but thence downwards is contracted sensibly; in some places to one half its breadth."

43.33. Very Tight Narrow Stricture at the Bulb of the Urethra.

Hunterian. BB. 57.

Urethra and bladder opened, the former from the under side, the latter from before. "The bladder is very much thickened and fasciculated; there is a very thin stricture extending not above one-sixteenth of an inch in breadth, just where the membranous part of the urethra terminates in the bulb; the breadth of the urethra before and behind this stricture is pointed out by cross bits of quill" (which had been removed after the specimen had become hard). It is figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. IV., fig. 3, and described as follows: "Represents a stricture at the bulb of the urethra, where the sides of the urethra had approached each other nearly in a point, and where the stricture is so narrow as just to allow a bristle to pass through it."

43.34. Stricture of the Penile Portion of the Urethra.

Hunterian. BB. 58.

The penis with a portion of the bladder, split open from the dorsal surface, laying open the urethra, and showing two strictures,

both fairly tight—the one about two inches from the meatus, the other near the bulb. The penile one narrow, the bulbar one of considerable extent. (Matthew Baillie's *Engravings*, Fasc. VIII., Pl. IV., fig. 2.)

43.35. Stricture of the Urethra resulting in a Urinary Fistula. *Hunterian. AA. 42.*

A bladder and penis, the urethra opened from the dorsum, showing a very tight stricture of the penile portion, a little in front of the scrotum. The mucous membrane of the part of the urethra anterior to the stricture has been diseased, and is rough and more or less contracted. Behind the stricture is an irregular dilatation from which the fistula rises and passes slightly forwards, to open on the skin just in front of the scrotum; marked by a bougie.

43.36. Stricture of the Urethra; Ulceration of Membranous Portion; Perineal Abscess; Dilatation of Ducts of Prostate Gland. *Hunterian. AA. 45.*

A bladder with a portion of the penis, laid open from the dorsum, showing the above. There is a large ulceration of the floor of the membranous part of the urethra, through which an abscess cavity, about as large as a walnut, can be seen. Just at its anterior margin is the stricture, which was the cause of the condition, partly destroyed by the ulcerative process. "The bladder is considerably thickened and fasciculated; the prostate gland has its ducts enlarged from the pressure of the urine backward." (Figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. V., fig. 1.) "Represents an ulcer in the membranous part of urethra. It is of considerable extent, and had destroyed not only the coats of the urethra, but the integuments at this part."

43.37. Very Tight and Extensive Stricture of the Penile Portion of the Urethra. False Passages; Perineal Abscess and Fistula; Sinuses in Corpora Cavernosa. *Hunterian. BB. 58a.*

The bladder, penis, and perinaeum, "from a body in the dissecting room," the anterior part of the penis opened from below, the bladder and bulb from above. There was stricture from well forward back to the bulb of the urethra. "Bougies had been

employed and made a false road, pointed out by the most anterior bristle; there was a large fistulous orifice in perinaeo, leading into a large ulcerated ragged cavity, which extended towards each tuberosity of the ischium; from this sinuses led through the substance of each corpus cavernosum almost to the glans, and one of these is pointed out by a bougie; the bladder itself is thickened and fasciculated, and there are several orifices leading from the bulb of the urethra into the just now described cavity in perinaeo."

43. 38. Stricture of the Urethra; Dilatation and Ulceration behind it; Extravasation of Urine; Abscess in the Perinaeum. *Hunterian. BB. 58b.*

"The same parts nearly, from a sergeant in Burgoyne's light horse (an out-pensioner, Chelsea Hospital). There is stricture one inch and a half in length, about two inches within the urethra. He had kept this concealed for many years: meanwhile the urine pressing behind had ulcerated and dilated urethra, so large as to receive the first joint of one's thumb; there was also an abscess unsuspected in perinaeo. The suppression of urine had not been total till twenty-four hours before I was called; no catheter or bougie could pass, but a common probe passed, and the urine followed. It was twenty-four hours before I was sent for again; I found the urine had got into the cellular membrane, all over penis, scrotum, groins, and inside thighs, and was by its distension spreading mortification wherever it went. I made punctures everywhere in these parts, sent for Mr. Hunter, who opened the urethra beyond the stricture (as he believed), in doing which, a great quantity of foetid pus was discharged; the man by this time was become comatose and died next morning. A bristle bent upon itself shows the passage where the urine burst through; the prostate gland was rather large and scirrhus; bladder also much thickened." The word "suppression" is here used, as it appears to have been commonly used in the time of the Hunters, with the meaning of "retention." Compare under No. 41. 48.

43. 39. Stricture of the Urethra. False Passages and Abscesses in the Corpus Spongiosum. Perineal Fistula. *Hunterian. BB. 58c.*

Bladder and penis, opened from the dorsum, showing the above.

The penile part of the urethra has been more or less strictured in the greater part of its length. The abscesses are alongside and in free communication with the urethra. They have ulcerated between the corpus spongiosum and corpora cavernosa, and slightly into the last two.

43.40. Stricture of the Urethra. Perineal Fistulae. Hypertrophy of the Bladder. *Hunterian. BB. 62.*

Bladder, scrotum, and part of penis, opened from above. "There are two fistulous orifices in the membranous part of the urethra, and the stricture is at the beginning of the bulb. The bladder is much thickened; some vessels are injected with mercury from the lacunae near caput gallinaginis; they look like absorbents, and run up the ureters, but they may be traced to the veins."

43.41. Stricture of the Urethra; Fistula in the Perinaeum. *Hunterian. BB. 63.*

The same parts as in the preceding, showing a urethra generally constricted, with a urinary fistula from its membranous portion. The tissues of the perinaeum are thickened; the external orifice of the fistula is indicated by a pouting mass of granulations just behind the scrotum.

43.42. Atresia of the Vasa Deferentia. *Hunterian. Y. 65.*

"Two testicles from the same subject; the epididymis in both, instead of leading on to vas deferens, terminates abruptly in a blind point, in the one about half-way, and in the other just where it should join vas deferens." This specimen is found to correspond to that figured and described as follows by John Hunter, in connection with his paper "On the Glands called Vesiculæ Seminales" (Palmer's edition, Vol. IV., p. 23, line 32, and Pl. XXVII.): "In dissecting a male subject, in the year 1755, for a side view of the contents of the pelvis, I found a bag on the left side, lying contiguous to the peritoneum, just on the side of the pelvis where the internal iliac vessels divide above the angle of reflection of the peritoneum at the union of the bladder and rectum. The left vas deferens was seen passing on to this bag; and what is very singular, that of the right, or opposite side, crossed the bladder, near its union with the rectum,

to join it. I traced the left vas deferens down to the testicle; but on following the right through the ring of the external oblique muscle, I discovered that it terminated at once, about an inch from its passage out of the abdomen in a blunt point which was impervious. On examining the spermatic cord from this point to the testicle, I could not find any vas deferens; but, by beginning at the testicle, and tracing the epididymis from its origin, about half-way along where it lies upon the body of the testicle, I perceived that it at first became straight, and soon after seemed to terminate in a point. The canal at this part was so large as to allow of being filled with quicksilver; which, however, did not pass far, so that a portion of the epididymis was wanting, and likewise the vas deferens for nearly the whole length of the spermatic cord on the right side. On the left side the vas deferens began where the epididymis commonly terminates, and there was a deficiency of nearly an inch of the extremity of the epididymis. I then dissected the bag above mentioned, which proved to be the two vesiculæ; for, by blowing the air from one vas deferens I could only inflate half of it, and from the other vas deferens the other half. They contained the mucus commonly found in these bags; but upon the most accurate examination, I could neither discover any duct leading from them to the prostate gland, nor the remains of one."

43.43. Atresia of the Vas Deferens.

Hunterian. Z. 10.

"The vesiculæ seminales and prostate gland cut open; in the vas deferens of the left side appears a stricture totally obliterating the canal; notwithstanding of which the vesicula of that side was full of a brown fluid as usual. The cells of the prostate gland are enlarged from disease."

43.44. Hydrocele of the Tunica Vaginalis Testis.

Hunterian. Y. 63a.

A testicle showing a small thin-walled hydrocele.

43.45. Large Thick-walled Hydrocele of the Tunica Vaginalis Testis.

Hunterian. Y. 63c.

"A very large hydrocele; testicle lying in the very lowermost part, but the tunica vaginalis so thick that it never could have

contracted from inflammation or suppuration, so as to enclose and adhere to the testicle; and had an operation been performed, it would have perhaps been with propriety cut out." (Figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. VI., fig. 2.)

43.46. Adhesions in a Hydrocele of the Tunica Vaginalis Testis. *Hunterian. Y. 64a.*

"A hydrocele, perhaps after the radical cure had been attempted, as there are adhesions seen, and the testicle lies at the bottom and not behind the sack; the cremaster was exceedingly strong, the broadest and reddest ever seen perhaps, and was lost before it reached the lower end of the tunica vaginalis."

43.47. Inflammatory Adhesions in the Tunica Vaginalis. *Hunterian. Y. 67.*

Testicle, with the tunica vaginalis laid open, showing the above.

43.48. Inflammatory Adhesions in the Tunica Vaginalis. *Hunterian. Y. 67aa.*

Similar to the preceding.

43.49. Obliteration of the Tunica Vaginalis after Inflammation. *Hunterian. Y. 67b.*

A testicle split open showing the above. Figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. VII., fig. 1, as "adhesions of the tunica vaginalis testis to the body of the testicle"; which "arises from inflammation having taken place in the cavity of the tunica vaginalis." Possibly the result of injection for the radical cure of hydrocele.

43.50. Epididymitis. *Hunterian. Y. 70c.*

A testicle with the epididymis much enlarged. Its tubules appear to be dilated; on microscopic examination they were found to be full of shed epithelium; apparently a condition of catarrh. (MS. Notes, J.H.T., p. 106.)

43.51. Epididymitis.*Hunterian. Y. 70d.*

Similar to the preceding. (MS. Notes, J.H.T., p. 107.)

43.52. Chancres of the Glans Penis.*Hunterian. BB. 45.*

The anterior half of the "penis of a Jew; as the prepuce is removed it explains circumcision: there are also two large chancres on the glans. (Solomon Porter.)" The "chancres" are a rather superficial ulceration on the point of the glans around the urethra, and a second rather deeper ulcer, with sharply defined edges, on the dorsum of the glans. Probably soft chancres. The organ is rather overdistended with red injection.

43.53. Tubercular Ulceration of the Bladder.*Hunterian. CC. 39.*

The anterior parts of the uterus and vagina with part of the posterior wall of the bladder, showing "A sloughing disposition in the inner surface of the bladder. Case not known." There are a number of small irregular rounded raised yellowish patches on the mucous membrane in the neighbourhood of the orifices of the ureters. The area between the ureters is also occupied by what seems to be an ulcerated surface very similar in appearance to the patches, but not raised. The orifices themselves are unaffected. On microscopic examination, the condition is found to be one of tubercular disease of the bladder. (MS. Notes, J.H.T., p. 133.)

43.54. Tuberculosis of the Testicle.*Hunterian. Y. 68.*

"A scirrhus testicle" cut open, presenting an almost uniform fleshy substance without trace of tubules. On microscopic examination it was found to be tubercular; a good deal of it has undergone caseation, but not softening. The epididymis is somewhat enlarged, being apparently also involved. (MS. Notes, J.H.T., p. 103.)

43.55. Tuberculosis of the Testicle.*Hunterian. Y. 70b.*

A testicle slightly enlarged, "apparently of the scrophulous kind," "but little advanced." There are numerous tubercles of small size scattered among the tubules. The epididymis somewhat enlarged also. (MS. Notes, J.H.T., p. 105.)

43.56. "Ossifications of the Body of the Testicle."*Hunterian. Y. 72.*

A testicle, with the vas deferens injected with mercury, dried, and mounted in turpentine. The organ, by drying and immersion in turpentine, is made to resemble a piece of clear horn, in which appear a couple of white osseous or calcareous nodules, "about the size of the end of one's finger." Nature unknown; possibly old tubercular or syphilitic deposits or even parasites, dead and infiltrated with lime salts.

43.57. "Ossifications of the Body of the Testicle."*Hunterian. X. 73.*

Similar to the preceding; the supposed osseous nodules rather smaller.

V. TUMOURS OF THE BLADDER AND MALE GENITAL ORGANS.

**43.58. Projections of the Mucous Membrane of the Bladder.
Papillomatous (?).***Hunterian. AA. 30.*

"A bladder inverted, to show its inner coat produced at several parts into laminae, or processes of a quarter of an inch above the surface; these might be laid hold of along with the stone in lithotomy, and occasion dreadful symptoms." Microscopic examination—the tissue is very much degenerated, but the appearances suggest papillomata. (MS. Notes, J.H.T., p. 132.)

**43.58a. Recurrent Papilloma of the Bladder, removed
by Operation.***Presented by Dr. John Edgar, 1898.*

A number of irregularly-shaped rounded pieces of tissue of a greyish-white colour. Their interior is partly papillated, partly smooth from being enclosed in a fine fibrous capsule. In section they are seen to consist of long branching papillae, closely packed together. The base of the growth is not recognizable in the pieces, but there is seen to be a certain amount of a central solid core, from which the papillae spring. With the microscope the papillae are found to consist of a thin core of fibrous tissue, containing a considerable number of blood-vessels, sheathed with very thick stratified epithelium. The deeper cells of this are columnar in shape, the

more superficial ones of various shapes from being closely pressed together; they show no sign of becoming horny or squamous; the nuclei are oval and very large. There are also some solid rounded bodies composed of the same epithelial cells, in large masses, with very thin fibrous septa between them—appearances characteristic of an actively growing carcinoma rather than of a papilloma. The specimens are parts of growths removed by suprapubic cystotomy and scraping, from a woman (Mrs. C.), aet. 59. Patient was admitted to the Glasgow Samaritan Hospital in June, 1897, with a history of painful and frequent micturition since three years previously. Pus and blood had been present in the urine for a year. She complained of pain in the left iliac and hypogastric regions. Her appearance was markedly cachectic, suggesting the presence of malignant disease. Examination per vaginam revealed a considerable growth in the region of the trigone of the bladder, which with the cystoscope was recognized as papilloma. After the scraping the base of the growth was cauterized. Patient was readmitted in January, 1898, on account of a return of the symptoms, and a similar operation was performed. The growth was more extensive than before, and involved the ureters. Thereafter right hydronephrosis and uraemic symptoms developed, which both passed off and she returned home. In October, 1898, she was seen: the operation wound had opened, and some sloughing masses of tumour protruded through it; she was obviously ill, but able to go about. In the end of March, 1899, she was still alive and able to do her house work; but towards the end of April she died. Post-mortem examination was not obtained.

43.59. Sarcoma of the Prostate Gland.

Hunterian. —.

The greater part of a bladder, opened from before, with a large mass, evidently prostate gland enormously enlarged by tumour, occupying its base. The tumour is of irregularly rounded form, measures 9 cm. in diameter (rather larger than a cricket ball). The urethra, opened in front, is not deeply embedded in the tumour, which extends backwards, and laterally underneath the bladder, and up into it in the region of the trigone in a large irregularly rounded and lobulated mass of fairly soft consistence. The bladder is turned back to show the excrescence in it, which rises above the orifices of the ureters, blocking the right one, which is considerably dilated, but leaving the left patent, as it opens to the

side of the tumour. The diameter of this mass is about 5 cm. A slice has been taken off the right side of the tumour, outside the bladder, and to the naked eye the cut surface looks like ordinary hypertrophied prostate or myoma. The posterior surface of the mass is lobulated and soft like the projection into the bladder. Microscopic examination was rather unsatisfactory from the very much degenerated condition of the tissue. For the most part it suggests myoma, but at the edge of the excrescence in the base of the bladder the tumour tissue is seen infiltrating and destroying the vesical muscular tissue, which may be fairly taken for a proof that it is rather a spindle-celled sarcoma. The cells, where at all recognizable, seem to be long spindles with rod-shaped nuclei, like those of unstriated muscle. (MS. Notes, J.H.T., p. 113.) Not described in the old catalogue.

43.60. Chondro-Sarcoma of the Testicle. *Hunterian. Y. 71a.*

One half of a greatly enlarged testicle, formerly described as "cancerous." It is of irregular pyriform shape, and slightly lobulated externally. In section it is seen to be composed of interlacing fibrous strands, with softer tissue, partly breaking down, between them, and nodules of cartilage scattered about in greater or less abundance in different areas of the tumour; some parts are almost entirely cartilaginous. In microscopic structure it is very complex. A section, from an area containing very little cartilage, shows: (1) Tissue like young granulation tissue; (2) a somewhat similar tissue, but having less fibrous stroma and its cells arranged in masses rather like lymphatic gland tissue; (3) long spindle cells, like unstriated muscular tissue; (4) cartilage, which is highly cellular as if recently formed. (MS. Notes, J.H.T., p. 109.) Figured in Matthew Baillie's *Engravings*, Fasc. VIII., Pl. VIII., fig. 1, and described as a scirrhus of the testicle.

43.61. Carcinomatous and Cartilaginous Tumour of the Testicle. *Hunterian. Y. 71.*

A testicle very much enlarged and converted into a tumour, which is composed chiefly of nodules of cartilage, with a varying proportion of softer tissue between them. Nearer the epididymis the softer tissue predominates, and in the epididymis itself, which is greatly enlarged, there is no cartilage visible. Microscopically

the tumour consists of soft tissue with well-defined nodules of very cellular cartilage, which are enclosed in distinct fibrous capsules, embedded in it. The soft tissue in the neighbourhood of the cartilaginous nodules is, for the most part, in a state of necrosis. So far as can be made out, it has consisted of masses of cells in a well-defined alveolar stroma, the general appearance suggesting carcinoma. Near the surface of the testicle the tissue is fairly well preserved: there it consists of masses of large polygonal epithelial cells, lying in the meshes of a rather scanty fibrous stroma; clearly carcinoma. (MS. Notes, J.H.T., p. 108.)

43. 62. Carcinoma of the Testicle.

Hunterian. Y. 70.

“Sections of a scirrhus (or, according to Mr. Hunter, of a scrophulous) testicle, Mr. Hoquet’s. It is ten times the natural size, soft and pulpy; gave but little pain; was extirpated; patient seemed to recover, but died some months after of other scrophulous sores.” It presents a homogeneous fleshy section, is smooth externally, and in microscopic structure is a very cellular carcinoma. The epididymis is included in the tumour. (MS. Notes, J.H.T., p. 104.) A mass of secondarily infected lymphatic glands from the same case forms specimen No. 13.5. They show a similar structure. “He had a similar tumour on his head, and several such on the inside of his ribs.” He had also cystitis; his bladder forms No. 30 of this series.

SERIES 44.

ANATOMY OF THE ORGANS OF GENERATION IN THE FEMALE.

<i>The External Organs,</i>	1-13
<i>The Relations of the Pelvic Organs,</i>	14-19
<i>The Uterus and Appendages,</i>	20-44
<i>The Mammary Gland,</i>	45-56
<i>Comparative Anatomy,</i>	57-59

(a) *The External Organs.*

44.1. The External Genital Organs in the Female.

Hunterian. CC. 5.

A portion of the skin and underlying soft parts, including the whole of the external parts of generation and the perinaeum and anus of a full-grown woman. The upper part of the specimen consists of the mons veneris—a cushion of adipose tissue covered with hair overlying the pubic bones. Diverging from this below are two folds of skin—the labia majora; and between them two smaller folds of mucous membrane—the labia minora. At the junction of the labia minora in front is seen the point of the erectile organ or clitoris, covered by a hood-like fold of mucous membrane called its prepuce. Below this, in the middle line, is the orifice of the urethra set on a small raised tubercle. The labia majora terminate behind in a thin edge round the posterior border of the vagina, which is called the fourchette. Internal to this is a thin fold of mucous membrane continuous with the labia minora. The orifice of the vagina is covered by the hymen, which is perfect; its opening is a mere slit about half an inch long—a rather unusual form. The anus

is separated from the vagina by the perinaeum, which is about 2.5 cm. broad. On the other side of the specimen are seen parts of the cavities of the bladder, vagina, and rectum. "The parts were kept extended with melted wax, then hardened in spirits, after which the wax was removed."

44.2. The External Organs of Generation in the Female.

Hunterian. CC. 6.

The same parts as the preceding. The labia only slightly separated. The hymen, "very perfect," can be seen on holding the specimen up to the light. Its orifice, as in the former, is a very small slit, running longitudinally and slightly oblique. Behind, the crura clitoridis are displayed by dissection.

44.3. The External Organs of Generation in the Female.

Hunterian. CC. 7.

The labia majora rather more separated. A blue glass rod is passed through the urethra. The hymen is perfect, and shows the commonest form of that structure—a crescentic fold of mucous membrane round the sides and back of the vagina, leaving a round or slightly oval aperture, which "will admit a goose quill." The horns of the crescent run forward in a pair of thin loose folds to the sides of the meatus urinarius. The hymen is stretched by a pad of cotton wool. Compare No. 7 of this series.

44.4. The External Genitals of a Very Young Female Child.

Hunterian. CC. 13a.

The same parts, but very small, extended in a similar manner. There is a little thread or frenum passing from the meatus urinarius to the hymen, marked by a bristle. The labia minora project as far as the labia majora. Compare No. 14 of this series.

44.5. The External Genitals of a Female Child "at Two Years."

Hunterian. CC. 12.

Similar to the preceding; a little larger; bristles in the urethra, vagina, and anus.

44.6. The External Genitals in a Female Child "about Four Years Old." *Hunterian. CC. 8.*

Similar parts to the preceding; injected red; bristles in the urethra and vagina.

44.7. The External Genitals in a Female Child "at Four Years." The Hymen. *Hunterian. CC. 10.*

"The labia, vestibulum, and vagina extended as much as possible, to show the true shape of hymen, which is that of a crescent with the horns turned towards the sides of meatus urinae." Compare No. 3 of this series. This specimen also shows very clearly the sharp edge of the fourchette, and the fossa between it and the outside of the hymen called fossa navicularis.

44.8. The External Genitals of the Female "at Six or Eight Years." *Hunterian. CC. 11.*

Similar to the preceding but a little larger. The labia majora, which have been widely separated, are much more developed, and the labia minora and deeper parts more under cover of them than in the preceding specimens. Compare also No. 44.14.

44.9. The External Genitals of a Full Grown Woman. *Hunterian. CC. 14.*

The above "from a full-grown subject; the hymen less perfect, and will easily allow a finger to pass; however, enough appears to make it probable that she was never deflowered. The rete mucosum in this subject is very dark; it appears to pass on the inside of the labia, over the nymphae, and is lost on their inner edge, and on the inner edge of the preputium clitoridis, but does not cover the glans clitoridis, meatus urinae, or hymen." There is very little hair on the parts, which, in other respects, are those of an adult.

44.10. The External Genitals of an Adult Woman. *Hunterian. CC. 14a.*

Similar to the preceding. "Although the opening is large, yet the hymen appears perfect." It forms a crescentic margin round the back of the vaginal orifice; this is the most common form of the hymen. Compare Nos. 44.3 and 44.7.

44. 11. The External Genitals of an Adult Woman.*Hunterian. CC. 15.*

"The hymen on its inner edge much wrinkled, and the passage pretty wide so as to give some appearance of carunculae myrtiformes," indicating that it had been ruptured, probably only by coitus, the wrinkling of the vagina as seen from behind, being more regular and distinct than it would be if the subject had ever borne a child. Compare Nos. 44.13, 44.19, and 44.30.

44. 12. The External Genitals of an Adult Negro Woman.*Hunterian. CC. 16.*

A similar preparation "from a negro girl, who had probably been deflowered, as the opening will admit one's thumb, yet there is a regular border of hymen all round: the pigmented rete mucosum terminates as in the former, though it is less evident on the clitoris, which is here small and indistinct: the rete mucosum passes also a little way within the anus."

44. 13. The External Genitals of an Old Woman.*Hunterian. CC. 16b.*

The external parts of generation, and the perinaeum of a woman who appears to have borne children. There is the appearance of cicatrization in the edge of the perinaeum, the fourchette is gone, and there is no trace of hymen. The orifice is much larger than in any of the preceding; the labia majora and minora have atrophied and are less firm and distinct. The mucous membrane of the vagina is thrown into folds just behind the urethra. From behind, the wrinkling of the vagina is seen to be rather indistinct and irregular.

*(b) The Relations of the Pelvic Organs.***44. 14. The Female Genitals in "a Foetus of Five Months."***Hunterian. CC. 26a.*

A female foetus of 5 months, injected red, hung upside down, most of the intestines removed, showing the uterus lying between the bladder and the rectum, and quite above the level of the

brim of the pelvis. Also the anterior ligaments, with the round ligaments in their edges, and the Fallopian tube and ovary. The uterus is smaller than the ovaries, which are long narrow bodies lying obliquely on the psoae muscles. The external genitals are also displayed. The labia minora and clitoris project beyond the labia majora. Compare Nos. 44.4–44.8.

44.15. The Genitals of a Young Female Child.

Hunterian. CC. 26.

“The contents of a child’s pelvis beautifully injected red, to show the situation of the uterus between rectum and bladder. The Fallopian tubes and ovaria are also well seen.”

44.16. The Contents of the Female Pelvis.

Hunterian. CC. 17a.

The uterus, vagina, bladder, and rectum filled with plaster of Paris, and then removed and mounted. “It shows the contents of the female unimpregnated pelvis at one view.” The ovaries have developed to the characteristic oval or olive shape of maturity. Shows well the vesico-vaginal and recto-vaginal (Douglas’) pouch of the peritoneum.

44.17. The Contents of the Female Pelvis. Side View.

Hunterian. CC. 18.

“A side view of the bladder, urethra, vagina, uterus, and rectum from a young woman; they were previously distended in spirits, and a portion cut out on one side to show their cavities fully. The labium, nympha, and one half of remains of hymen, with one side of the anus and perinaeum are seen.” The preparation also shows the flattened shape of the vagina, the anterior and posterior walls of which normally lie in contact; the manner in which the os uteri projects into the vagina from before and above; and the vesico-vaginal and recto-vaginal pouches of the peritoneum. The latter, called the pouch of Douglas, is only partly shown. Compare the succeeding specimen. The ovaries are longer and narrower than in the adult.

44.18. The Contents of the Female Pelvis. Side View.*Hunterian. CC. 19.*

"The same preparation from a full-grown subject, only the external parts and hymen are entire; vagina seems here about four inches long, but not so capacious as rectum; the urethra will admit a goose quill easily, and is about one inch long; the bladder on the upper side, and rectum on the under, appear firmly attached to vagina through its whole length" Looking at the preparation from above, it is seen that whereas the bladder is attached to the vagina in its whole length, there is a deep pouch (the recto-vaginal pouch of the peritoneum or pouch of Douglas) between the rectum and vagina, so that a considerable area of the back of the vagina is separated from the peritoneal cavity only by its own wall. "The uterus is not opened: it is the uterus of a pubes or girl just arrived at puberty, whose breasts will afterwards be described (Nos. 44.45 and 44.46). The Fallopian tubes, ovaries, and round ligaments are seen, so that this preparation exhibits the whole contents of the female pelvis." Injected red; on the rectum is seen a portion of the inferior haemorrhoidal artery.

44.19. The Genital Organs in a Young Woman. From before.*Hunterian. CC. 17.*

The labia, vagina, and uterus of a young woman, the vagina and uterus opened from before. The inner surface of the vagina is rugose, and near the orifice is seen a little fringe of hymen. The anterior wall is about 3 inches long, the posterior considerably longer, and the cavity can be seen to extend higher up behind than in front of the cervix. Compare the two preceding specimens.

*(c) The Uterus and Appendages.***44.20. The Os Uteri. Virgin.***Hunterian. CC. 20b.*

"A virgin's uterus about 16 years old," suspended by part of the vagina, and viewed from before. The os tincae "is a transverse fissure about a quarter of an inch long, and sufficiently resembles a tench's mouth." Sufficient of the vagina remains to show how the os uteri projects into it, and that the vagina runs higher up behind than before the os.

44. 21. The Os Uteri. Virgin.*Hunterian. CC. 20c.*

"A virgin uterus" and appendages "from a girl about 18 years old," laid open in front, suspended by the posterior wall of the vagina, showing the os uteri a transverse slit.

44. 22. The Os Uteri after Child-Bearing.*Hunterian. CC. 20a.*

Part of the body and the cervix of the uterus of a woman who had borne a child, suspended obliquely upside down, showing the os uteri a small round hole with the cicatrices of former lacerations radiating from it.

44. 23. The Female Genital Organs and Bladder. From an Adult.*Hunterian. CC. 21.*

The uterus and vagina are laid open from behind, and the bladder, which has been partly distended, and the urethra from before. Below are seen the labia majora and minora, with the clitoris, the orifice of the urethra, and the hymen, which has been cut across. The last is very small and indistinct, as are also the rugae of the vagina. The subject was, therefore, probably not a virgin, but the rugae of the cervix uteri, and the size and shape of the uterus show that she had not borne children. In front is seen the bladder with bristles in the ureters, and the urethra opened down to its orifice. The shortness of the latter, and the absence of firm structures round it, contrasts with the condition in the male. The floor of the urethra is thrown into rugae. The preparation is injected red. The vagina, bladder, and urethra, and the fimbriated extremities of the Fallopian tubes appear very vascular.

44. 24. The Female Genitals and Bladder in an Adult.*Hunterian. CC. 22.*

A similar preparation, but without the labia majora, and not injected. The divided ends of the hymen, marked with knots of thread, are very distinct. "Vagina very rugous, especially on the side next the urethra." There is a piece of tinfoil rolled in the urethra, and bristles in the ducts of "Cooper's (Bartholini's) glands, and by the edge of the hymen." There are also bristles in the Fallopian tubes.

44.25. The Arteries of the Uterus. *Hunterian. CC. 23.*

The uterus from an adult female. The arteries injected red and dissected, showing the two sources of the uterine blood supply, viz., (1) the hypogastric arteries passing from the brim of the pelvis to the side of the cervix and sending branches down to the vagina, and upwards on the side of the uterus, and (2) branches of the ovarian arteries running in from the broad ligament. These two sets of vessels meet and form a rich anastomosis in the body and fundus. Compare specimens in the Gravid Uterus series, No. 48.27 *et seq.* The uterus is opened from behind, and there are bristles in the Fallopian tubes.

44.26. The Arteries and Veins of the Uterus and Ovaries.*Hunterian. CC. 24.*

One half of the uterus and vagina divided in sagittal section, injected red by the arteries, yellow by the veins. The veins, distended with injection, form a couple of varicose masses of enormous size in comparison to the uterus and ovaries. The specimen does not show the course of the vessels distinctly; the veins, however, clearly accompany the arteries. In the section are seen the cavity of the uterus, its sides almost in contact; the muscular wall is about $\frac{3}{4}$ of an inch (1 cm.) and the mucous membrane fully $\frac{1}{16}$ of an inch (.15 cm.) in thickness, and there are numerous blood vessels, especially about the middle of the organ. A bristle is passed into the Fallopian tube, and another, in the lower part of the specimen, through the urethra.

44.27. Arteries and Veins of the Uterus.*Hunterian. CC. 25.*

Other half of the preceding. The veins about the side of the cervix uteri and vagina are very numerous and large.

44.28. The Uterus.*Hunterian. CC. 27.*

An uterus laid open from behind to show the thickness of its walls and its cavity. The latter is divided into two portions, which present very different characters—(1) the cavity of the cervix and (2) the cavity of the body. They are of nearly equal length; a slight constriction, called the os uteri internum, marks

the boundary between them. The cavity of the cervix is oblong, and its mucous membrane is thrown into regular rugae, called the *arbor vitae uterinus*. The cavity of the body is triangular in shape. See succeeding specimens.

44. 29. The Uterus and its Appendages.

Hunterian. CC. 28.

An uterus and its appendages cut off a little above the level of the *os internum*, and hung by the right ovary and Fallopian tube. "The preparation hangs side ways by the right Fallopian tube, near its *fimbria*. The cavity of the uterus in this view is not half an inch long, and is merely a line in breadth, but not a straight line, making a portion of a circle; the Fallopian tube makes the upper edge of the broad ligament, the ovarium is behind in that ligament, and the round ligament is before; the *fimbriae* of the external orifice of the Fallopian tube are continued down half an inch to the body of ovarium, and form as it were a fringed chain of connection." The ovary is of rounded shape, and wrinkled externally. Note also the round ligament of the ovary attaching it to the uterus.

44. 30. The Vagina, Uterus, and Appendages of a Virgin. From behind.

Hunterian. CC. 29.

The vagina, uterus and appendages, and rectum of a virgin laid open; "the *cervix uteri* is the principal object; the rugae in it resemble the long leaves of rushes from a middle stem; the cervix is much longer than the fundus; both taken together are not above two inches in length, the breadth is about one inch at the very uppermost part of fundus: there are bristles in the interior orifices of the Fallopian tubes," and in the *fimbriated* extremity of the right. The tubes are thrown forward so as to display the ovaries. The vagina is typically virgin, being exceedingly rugose, and presenting near its orifice a very well marked hymen. Compare specimens Nos. 44.1-44.13.

44. 31. The Cavity of the Cervix Uteri.

Hunterian. CC. 29a.

The above laid open. The rugae *pennatae* exceedingly beautiful.

44. 32. The Vagina, Uterus, and Appendages of a Virgin.
From before. *Hunterian. CC. 30.*

A similar preparation to No. 44.30, but opened before instead of behind, showing the cavity of the uterus as in that specimen. Also the vagina very rugose, and with a well-marked hymen, the aperture of which, before it was cut open, must have been of small size. In front are the crura of the clitoris dissected.

44. 33. The Uterus and Vagina of a Virgin. From before.
Hunterian. CC. 30a.

Similar to the preceding, with the labia majora also preserved.

44. 34. The Uterus and Vagina. Opened from before.
Hunterian. CC. 31.

Similar to the preceding. The urethra is marked with a quill. "The body of this uterus is not in the same direction as the vagina, but inclined to the right, and the (cavities of the) cervix and fundus are nearly equal in length." Compare No. 44.28 of this series. Bristles are placed in the ducts of the glands of Bartholini.

44. 35. The Uterus and Vagina in a Young Child.
Hunterian. CC. 32.

A similar preparation from a very young child, opened from before, showing the uterus almost all cervix and the appendages very small. The vagina is finely corrugated and the hymen very well marked.

44. 36. The Uterus and Appendages in a Young Girl.
Hunterian. CC. 33.

The anterior half of the vagina and uterus with a small portion of the bladder and the appendages. The uterus is small and the cervical portion is large in proportion to the fundus. The ovaries are fairly large, shaped something like the human spleen, and hang out from the back of the broad ligaments, which are well spread out.

44.37. The Cavity of the Uterus, the Fallopian Tubes, and the Ovaries. *Hunterian. CC. 34.*

The posterior half of an uterus with the Fallopian tubes and ovaries, showing the shape of the cavity. The cavity of the fundus is nearly triangular, but its sides are curved with the convexities inwards, which gives it a horned appearance like in the lower animals. The orifices of the Fallopian tubes and the os internum occupy the three corners. The ovaries are large and wrinkled, and split open so as to show in the left a corpus luteum. Compare Gravid Uterus series. The Fallopian tubes, with their fimbriated extremities, are well displayed. A couple of little cysts (hydatids of Morgagni) hang from the extremity of the left. One of the mucous glands of the cervix has also developed a small clear cyst.

44.38. The Cavity of the Uterus. *Hunterian. CC. 35.*

Anterior half of uterus showing the shape of the cavity.

44.39. The Cavity of the Uterus. *Hunterian. CC. 35a.*

Similar to the preceding. Shows also a portion of the bladder with bristles in the ureters.

44.40. The Cavity of the Uterus. *Hunterian. CC. 40.*

The uterus and vagina split from side to side, and hung with the anterior half turned up. Shows the same as the preceding.

44.41. The Ovary and Fallopian Tube. *Hunterian. CC. 41.*

Part of the right broad ligament of the uterus showing the ovary. It is tuberculated, broad, and flat, about the size of a large almond. Shows also the outer part of the Fallopian tube, with the fringed border of its external orifice—the fimbriated extremity—“resembling the flower of a pink in some degree.”

44.42. The Ovary and Fallopian Tube. The Parovarium. *Hunterian. CC. 41a.*

Similar parts from the left side including a part of the uterus. The ovary is less flattened; shows the more usual shape of the

organ. Between the ovary and the outer end of the Fallopian tube there may be seen, on holding it up to the light, a number of parallel curved tubes which appear to be the organ of Rosenmüller or parovarium—the remains of the Wolffian ducts and tubules ; not a good specimen of this structure.

44. 43. The Fimbriated Extremity of the Fallopian Tube.

Hunterian. CC. 42.

Part of the broad ligament well spread out to show the fimbriae making a regular double fringe for about an inch between the orifice of the tube and the ovary.

44. 44. The Fallopian Tube.

Hunterian. CC. 43.

“Fallopian tube slit open its whole length, to show that it is broader near the external, and narrow, very narrow, towards the uterus ; its inner surface is also thrown into longitudinal rugae, like those internal surfaces which are occasionally to be distended.”

(d) The Mammary Glands.

44. 45. The Mammary Gland of a Girl at Puberty.

Hunterian. DD. 1.

“A perpendicular section through the nipple and body of the mamma, from a girl at puberty, so as to look on the cut edges ; the integuments are *in situ* ; the gland is somewhat circular, and about three inches in diameter, and one in thickness at the centre ; the substance of the gland is injected red, and is easily distinguished by its red white, from the yellow white of the intermixed lumps of fat.” The glands are from the same subject as the uterus and appendages which form No. 44.18.

44. 46. The Mammary Gland of a Girl at Puberty.

Hunterian. DD. 2.

“A horizontal section of the mamma of the opposite side, from the same girl ; shows very well the intermixture of fat with the glandular substance, also that the very centre is all substance of gland without the least fat.”

44. 47. Section of Mammary Gland during Lactation.*Hunterian. DD. 3.*

The section traverses the centre of the organ and includes the nipple, the point of which is cut off to show the lactiferous ducts. The quantity of gland tissue is enormous compared with that in the preceding specimens. The pigmented areola round the nipple is well marked.

44. 48. Pigmentation of the Nipple in Pregnancy.*Hunterian. DD. 4.*

"The central portion of the mamma from a pregnant woman; the areola is of a dark brown, except where cuticle and rete mucosum have been removed; there it is a perfect white, and shows the blackness depended on rete mucosum."

44. 49. The Lactiferous Ducts.*Hunterian. DD. 5.*

"A portion of the mamma in which the tubuli lactiferi are filled with red corroding injection; their diameters near the nipple are larger than those of crow quills." The injection seems to have penetrated to the acini of the gland.

44. 50. The Lactiferous Ducts.*Hunterian. DD. 6.*

Portion of a mamma, showing the above injected with mercury. Dried and mounted in turpentine.

44. 51. The Lactiferous Ducts and Acini of the Mammary Gland.*Hunterian. CC. 9.*

"A most beautiful injection of about one-fourth of the mamma from a woman (B.H.), who died just after delivery. The tubuli are filled with mercury, but not seen distinctly, on account of the vast number of follicles, and that the preparation which was removed out of spirits of wine into turpentine, is not yet perfectly dried." Still obscure (1896), but a beautiful preparation, the mercury having entered the ultimate acini of the gland.

44. 52. The Lactiferous Ducts and Acini of the Mammary Gland. *Hunterian. CC. 9a.*

Similar to the preceding; in turpentine. The mercury, after filling the lactiferous tubes, has passed also into the ultimate acini.

44. 53. The Lactiferous Ducts and Acini of the Mammary Gland. *Jeffray Collection.*

A mamma with the above injected partly with mercury, partly white. Mounted in turpentine.

44. 54. The Nipple and Lactiferous Ducts.

Hunterian. DD. 11.

"The central portion of a mamma with twelve black bristles introduced into the orifices of as many tubuli on the nipple."

44. 55. The Nipple.

Hunterian. DD. 12.

The nipple with 25 bristles introduced into the ducts.

44. 56. The Nipple.

Hunterian. DD. 13.

Similar to the preceding.

Comparative Anatomy.

44. 57. The Mammary Gland of a Pregnant Rabbit.

Hunterian. DD. 7.

"One of the mammae in the pregnant rabbit, about three inches long, and two broad; near the nipple the tubuli enlarge into reservoirs nearly as large as gun bullets, then grow narrower as they come to the nipple; the gland is not completely filled, as it required the injecting tube to be introduced into distinct tubuli, in order to fill more than a portion; the follicles are not only found with small peduncles on the extreme branches, but form cells without any peduncle on the bodies of the great trunks before they ramify." Injected with mercury; in turpentine.

44.58. The Mammary Glands of a Suckling Bitch.*Hunterian. DD. 10a.*

“Two of the mammae from a bitch of the bull-dog size, some weeks after suckling: tubuli are not quite so large as in woman, nor has the mercury run sufficiently minutely to fill the follicles; they are beautifully radiated, however, and several absorbent vessels have been filled from the cavity of the tubes near the nipple; those run between the skin and mamma upwards, in the direction of left subclavian.” In turpentine.

44.59. Section of the Mamma of a Goat.*Hunterian. G. 28.*

“The breast of the West Indian goat; it was first injected with mercury, then dried, now cut open. There is but one tubulus lactiferus the size of one’s finger, which opens into a kind of cavernous substance, probably follicular on the outside.” In turpentine.

SERIES 45.

MALFORMATIONS, INJURIES, AND DISEASES OF THE FEMALE GENITAL ORGANS.

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I. CONGENITAL DEFECTS AND MALFORMATIONS.

45.1. Enlargement of the Clitoris. *Hunterian. CC. 16a.*

The external and internal parts of generation of a girl approaching puberty, showing the clitoris and its prepuce so large as to resemble the corresponding organ in the male. The rest of the external and the internal organs are not fully developed, but otherwise perfectly normal.

II. INJURIES AND DISPLACEMENTS OF THE FEMALE GENITALS.

45.2. Inversion of the Uterus. *Hunterian. CC. 60a.*

The uterus and vagina, laid open from behind, showing the above. The body of the uterus, which is about the size of the normal organ in the unimpregnated condition, is very completely inverted. The doubling is about the level of the os internum, and the inverted fundus reaches to the level of the os externum. The condition is evidently of old standing, but there is no history of the case, and the cause cannot be made out. The cervix is very greatly dilated and its walls thinned; the point at which it meets the vagina is by no means distinct. The Fallopian tubes dip down into the hollow of the inversion, being pressed close together, and even now, when the uterus has been laid open, they are only about 5 mm. apart. The internal orifices are not visible.

45.3. Partial Inversion of the Uterus by a Myoma.*Hunterian. CC. 95a.*

This specimen is most conveniently described as consisting of an upper part, which is laid open in front, and a lower part. The upper part, owing to the inversion, shows three layers; the outer consists of the vagina, which is partly inverted into itself and greatly stretched. Enclosed in this is the second layer, consisting of vaginal wall and cervix, inverted and turned up round the body of the uterus which forms the centre of the mass. The upper part of the body of the uterus seems to be stretched and thinned out, but preserves to a considerable extent its natural relations to the

Fallopian tubes. The lower part of the specimen, the myoma, which is about the size of a large orange, springs by a neck about 3 cm. in diameter from the posterior wall of the uterus a little above the os internum, and hangs down into the vagina. It has inverted the lower (cervical) part of the uterus, and dragged the rest down bodily, and partly inverted it. The Fallopian tubes with the uterine tissue between them form a narrow ridge, straight on the top, behind which dips down a deep pocket of inversion of the fundus uteri corresponding to the attachment of the tumour. The different layers are united by fibrous adhesions.

45.4. Inversion of the Vagina and Prolapse of the Uterus.

Hunterian. CC. 61.

The uterus, appendages, and part of the vagina, "from the dissecting room," "vagina had been so inverted and exposed to the air that it had acquired the look of skin, and was hard and callous." The greater part of the vagina has been cut away; the uterus is opened behind; the os is somewhat spread out; it is level with the surface of the everted vagina. The ovaries are both cystic; the right as large as a walnut.

45.5. Prolapse of the Uterus causing Retention of Urine.

Hunterian. CC. 59a.

The posterior wall of the bladder and the urethra (opened above) with the uterus and part of the vagina, showing the uterus prolapsed till the os is at the level of the neck of the bladder. The old description is as follows:—"The bladder, and uterus also of a maid at forty-five; os tincae here also round; but it is principally intended to show uterus growing close to the bladder; the os tincae pressed on the neck of the bladder, and occasioned inability to make water; even the catheter could not be introduced till she was bled; was at this rate bled about three hundred times in five years; was not dropsical." The uterus and appendages and bladder are considerably matted together by fibrous adhesions, and the anterior vaginal wall from the cervix to the urethra is not much more than 2 cm. in length, and much folded. The uterus is about the normal size, and quite straight. The rectum and posterior vaginal wall have been cut away.

45.6. Complete Eversion of the Vagina, and Prolapse of the Uterus and Bladder. *Hunterian. CC. 60.*

The specimen is hung by the labia majora, which, diverging widely, form a collar round the neck of the protrusion. The portion of the vulva called the vestibule, recognizable by the presence of the labia minora and clitoris, is greatly stretched and spread out. At the lower border of this is the meatus urinarius, looking directly upwards, marked by a quill. Below this, the vagina, entirely turned inside out, formed a bag containing the bladder and uterus; its anterior wall has been divided and dissected aside, and an incision made through the posterior wall of the bladder to show that it was full of calculi. The vagina is completely everted and prolapsed beyond the labia majora. The os uteri, looking directly to the bottom of the jar, occupies the apex of the bag. From above are seen the Fallopian tubes dipping down to the fundus uteri, the top of which is quite as low as the natural orifice of the vagina. With a probe the cavity of the uterus is found to measure 8.5 cm. The vaginal wall is greatly thickened.

45.7. Complete Prolapse of the Uterus.

Hunterian. CC. 61a.

The specimen shows the vagina completely inverted and extruded beyond the vulva. The mucous membrane has become hard and skin-like. The Fallopian tubes and ovaries are the only parts of the internal genitals which remain visible, all the rest being down in the sac of the protrusion. The urethra and os uteri are marked by straight bougies, and the anus by a bent one.

45.8. Complete Prolapse of the Uterus.

Hunterian. CC. 61b.

A very similar preparation, but with the symphysis pubis preserved. The vagina is cut open behind to show how low the uterus has descended. The everted vagina is, as in the previous specimens, hard and skin-like. There is some ulceration around the os, which is situated, as in the preceding, at the apex of the protrusion. The vestibule and labia minora are everted and stretched out above the protrusion, and the clitoris and meatus urinarius appear level with the skin and quite unprotected.

45.9. Eversion of the Vagina with Incomplete Prolapse of the Uterus.

Hunterian. CC. 60c.

A similar preparation, but smaller and without the symphysis pubis. The surface of the vagina is ulcerated in several places. "From the dissecting room."

III. CHANGES THE RESULT OF INFLAMMATORY DISEASE.

45.10. Mortification of the Vagina.

Hunterian. CC. 62.

"Vagina inverted; it sloughed away entirely from the os tincae; the woman, notwithstanding, recovered." "This mortified vagina came from a gentlewoman whom I attended in a miscarriage. I saw what came away, in which there was nothing uncommon, and therefore I had no occasion to examine her. She was taken with a quickness of the pulse, and had a little fever; this at first I thought to be a little cold. The fever grew more considerable, and I advised her physician, Dr. Battie, might be consulted. He attended her, and I took my leave. In two or three days I called again and found her much worse, and then she told me there was something extraordinary the matter, for the parts were all black. I examined her, opened the labia, which, with the nymphae, clitoris, and, in short, every part within my sight, were quite black, and blacker than I ever saw any mortification. At the same time she had a burning heat upon her, and a very quick pulse; it was a mortification, but could have had no relation to her lying in, where she might have been hurt by hands or instruments; but here it was quite different. She had got a mortification that was likely to kill her. Mr. Middleton was employed, and on considering the woman's pulse, and seeing the mortification go on so, we had not the least hopes. The mortification went on and on and at last separated, and when the sloughs were thrown off, all the flesh was found to come away quite down to the os sacrum, and in one dressing a deal of sloughs, etc., fell into the vagina and it could not be brought away, but it stuck close just at one end. When it came away, Mr. Middleton and I examined it, and we found that the whole of the inside of the vagina as far as the inside of the os tincae entirely sloughed off, and the inside of the thighs and hips, etc., sloughed away. Now you will say, gentlemen, that this is 'one of Hunter's cases,' but if you do say so, it will not be of so

much use as I mean it, because there has not been the least circumstance exaggerated. It all healed up afterwards, and left a small hole to discharge the water and catamenia." (William Hunter's *Midwifery Lectures*, MS. R.C.S., Eng., 42, c. 31.)

45.11. Ulceration of the Vagina by a Pessary.

Hunterian. CC. 62a.

"The uterus and vagina of Mrs. Crook, who died of dropsy of the right ovary, and had besides an exceedingly large umbilical rupture; vagina is opened to show the bed of a large pessary which was encrusted with a coat of coagulable lymph and calcareous earth, so as to feel like stone; one edge of the pessary had made its way through vagina: there had been considerable bearing down, and discharge per vaginam." There has been a considerable rectocele, and the back edge of the pessary has rested above this, and ulcerated through into the pouch of Douglas, which is distended to show the perforation. The front edge of the pessary passed high up in front of the cervix. The bladder has been cut away. See next specimen for the pessary.

45.12. Pessary from the Preceding Case.

Hunterian. CC. 62a.

It is a large wooden ring pessary, about 8.5 cm. in diameter. It is encrusted with lime salts.

45.13. Pessaries encrusted with Phosphates.

Hunterian.

A couple of wooden pessaries encrusted with masses of fusible mixed phosphates. History unknown, but probably, like the preceding, they had been placed in the vagina, and allowed to remain there undisturbed for a long period—too long, doubtless, for the comfort and welfare of the wearer.

45.14. Inflammatory Occlusion of the Vagina. Perimetritis.

Hunterian. CC. 58.

"The uterus, vagina, and vulva; the vagina is obliterated about an inch within the vestibulum, probably from long continued venereal inflammation." There is a projection of the vaginal wall

just above the meatus urinarius—probably a slight degree of cystocele—and some caruncles of the meatus. The uterus is covered with fibrous adhesions due to perimetritis.

45.15. Stricture of the Os Uteri Internum.

Hunterian. CC. 59.

“One half of the uterus in a section from side to side; fundus uteri rather large; there is an obliteration of the cervix just where fundus begins: similar to stricture in the urethra.”

45.16. Stricture of the Os Uteri Internum.

Hunterian. CC. 59aa.

“A section of another uterus with a similar stricture, but not so complete.”

45.17. Perimetritis.

Hunterian. CC. 110.

Right half of uterus with appendages; showing a few loose fibrous tags on the fundus, the result of inflammation of the peritoneal covering of the uterus and adjacent structures. On the jar is scratched, “section of uterus to show its cavity.” Not described in the old catalogue.

45.18. Endometritis and Perimetritis. *Hunterian. CC. 105.*

“Uterus slit open (before); rather large like No. 97 (lost), but on the posterior part has a large portion of the thickened omentum adhering to it, showing that it had once been inflamed. Case not known.” The left appendages are matted together. Besides the enlargement of the uterine cavity, the mucous membrane is thickened and rough.

45.19. Pyosalpinx.

Presented by Dr. J. K. Kelly, 1897.

The left Fallopian tube and ovary and the right Fallopian tube removed by operation from a case of double pyosalpinx, diagnosed as of gonorrhoeal origin. The tubes are somewhat convoluted and thickened—rather thicker than a lead pencil. The thickening is due partly to distension with pus, partly to increase in the thickness of their walls. The left ovary appears to be healthy except that

it is covered with fibrous adhesions. The right ovary was reduced to an abscess cavity buried in adhesions; its remains were scraped out, and the cavity plugged with an antiseptic dressing. The specimen illustrates the conditions most commonly found in cases of pyosalpinx.

45.20. Unusually Large Pyosalpinx.

Presented by Dr. J. K. Kelly, 1897.

Uterus and Fallopian tubes, of which the following history was given by Dr. Kelly:—"J.H., aet. 33; unipara. Since birth of child, 4 years ago, has suffered from pain and sickness, and feeling of prolapsus uteri, frequent menstruation, cramps in legs, and menorrhagia. Examination revealed cystic tumour in left ovarian region, slightly tender to pressure. 29th Sept., 1894, abdominal section; first removal of right tube and ovary, then of left pyosalpinx and corpus uteri. Had a tedious recovery owing to sponge having been left in abdomen until 20th October. Dism. 28th Dec." The lower part of the preparation shows the left Fallopian tube, ovary, and broad ligament matted together and bound to the side of the uterus by fibrous adhesions; the tube alone is recognizable; it is laid open. Supravaginal amputation of the uterus was the only operation which was possible. The tube is greatly enlarged in every way, convoluted, stretched, and bent, as if round the ovary for centre, into a complete circle; it measures fully 22 cm. in length. Its diameter close to the uterus is nearly 2 cm., and increases gradually to nearly 4 cm. towards its outer end. Its walls, in different parts, measure from 2 to 6 mm. in thickness. The remains of the fimbriated extremity can be recognized close to the side of the uterus on the rounded end of the tube. The other tube is an ordinary small pyosalpinx.

45.21. Pyosalpinx and Hydrosalpinx.

Presented by Dr. J. K. Kelly, 1897.

The body of the uterus and the altered appendages, removed by supravaginal hysterectomy; hung by the right Fallopian tube. "Mrs. B., aet. 23; nullipara. She had a miscarriage about the 4th mo., in Jan., 1896; since then abdominal pain and tumour. On admission, 15th Aug., 1896, uterus was found to be small, depressed, and strongly anteflexed. Large cyst in right posterior

part of pelvis, and smaller cyst on left side; tubes on both sides passing into the tumours. Diagnosis, double pyosalpinx. 21st Aug., abdominal section. Left hydrosalpinx, containing about 19 ounces of fluid, was removed (the large extremity of the left tube filled the right posterior quadrant of the pelvis); then the small right pyosalpinx, containing about 2 ounces of pus (to which and to the right angle of the uterus the lower edge of the omentum was attached), was removed along with the corpus uteri. 21st Sept., dismissed well." The right tube is considerably enlarged, elongated, and convoluted, not much enlarged close to the uterus, but fully 3 cm. in diameter in the outer segment. A mass of omentum adheres to it. The left tube is very greatly enlarged, convoluted, and stretched out to a length of about 25 cm. Like the other it is small at its inner end, increases gradually in size for the inner two-thirds to a diameter of 3 cm., and the outer segment is expanded into a thin walled cyst about the size of the foetal head at term. The ovaries are seen lying in the concavities of the twisted tubes, to all appearance normal.

45.22. Pyosalpinx and Suppuration in a Cystic Ovary.

Presented by Dr. J. K. Kelly, 1898.

The Fallopian tube and ovary of both sides, removed from a case of double pyosalpinx. On the right the ovary is about the size of a hen's egg, the enlargement being chiefly due to the presence of a large simple cyst, which was full of very foetid pus. The tube lies on the ovary, buried in a mass of fibrous adhesions; it is somewhat thickened, and contains a little pus. The left tube is also only slightly thickened, and contains very little pus. Its fimbriated extremity is planted on the end of the ovary like a bell mouth, and bound to it round the edges by fibrous adhesions. In section the ovary shows numbers of Graafian follicles, which were not in a state of suppuration.

45.23. Hypertrophic Endometritis.

Hunterian. RR. 119.

Uterus laid open from behind, showing the cavity slightly enlarged, and the mucous lining greatly thickened and thrown into irregular nodules and ridges. Apparently a condition of inflammatory over-growth of the mucous membrane. The uterus is closely bound to the back of the bladder by perimetritic adhesions.

It appears not to be the specimen which was originally in the bottle, as the descriptions do not at all correspond.

45.24. Chronic Abscess of the Mamma, simulating Cancerous Growth. *Presented by Dr. T. K. Dalziel, 1897.*

One half of a large mammary gland, illustrating the above. "The specimen was obtained by excision in November, 1897, from a woman, aged 42. The clinical features were suggestive of malignant disease, there being a dense firm mass in the mammary gland, with enlargement of the axillary lymphatic glands. History dated a year back; no pain on pressure; no oedema or redness of the skin, which was, however, adherent and puckered. No history of tubercle or injury, but the patient was weak-minded, and ultimately became insane." In the middle of the breast, below and to one side of the nipple (which for the most part remains with the part retained by Dr. Dalziel), there is a great mass of rather dense fibrous tissue, with a couple of cavities, which contained pus. They have very thick walls. Microscopic examination showed fibrous tissues of varying density, portions of gland, and a large amount of inflammatory cell formation, here and there amounting to actual small abscesses; no evidence that the condition is of tubercular nature. (W. of Scotland Clin. Research Lab., No. 1/206.)

45.25. Tubercular Disease of the Ovaries and Fallopian Tubes. Ulceration into Bladder. *Hunterian. CC. 57.*

"Uterus, vagina, and bladder, from a woman in the dissecting room: the body of the uterus pretty sound, but the ovaria of both sides much enlarged and ulcerated; several abscesses were also found, and the disease had extended to the bladder, which has two holes communicating with these abscesses: these holes are pointed out by quills." The two main abscesses are of the ovaries; that on the left has been split by two incisions, and the outer segments turned down before and behind; the right is simply split, so as to show the abscess cavities. The Fallopian tubes are for the most part cut away, but what remains shows that they were thickened very considerably. Microscopic examination of portions of "abscess" wall and Fallopian tube shows the disease to be tubercular. (MS. Notes, J.H.T., p. 137.)

IV. TUMOURS OF THE FEMALE GENITAL ORGANS.

*(a) Innocent Tumours of the Uterus, Vagina,
and Vulva.***45.26. Adenoma of the Uterus.** *Hunterian. CC. 70b.*

"Uterus and vagina slit open: a tubercle attached by a small peduncle, is seen in the fundus of the uterus like a small garden bean; several very small ones are also seen in the cervix." Sections of the large one show a structure consisting of loose fibrous tissue with a few simple cysts—a simple adenoma. (MS. Notes, J.H.T., p. 121.)

45.27. Adenoma of the Uterus. *Hunterian. CC. 72.*

"Uterus slit open: a polypus with a pretty broad neck appears in the substance of the fundus, with a black bristle tied round it; the polypus is not larger than the end of one's finger." On microscopic examination it is found to be a simple adenoma. (MS. Notes, J.H.T., p. 122.)

45.28. Adenoma of the Uterus. *Hunterian. CC. 70.*

Uterus slit open, showing a very small tumour similar to the preceding, hanging in the middle of the back of the fundus.

45.29. Mucous Polypi (Adenomata) of the Uterus.*Hunterian. CC. 73.*

Uterus slit open, showing two tumours of considerable size, similar to the preceding. The larger one projects from the left side of the cavity just below the orifice of the Fallopian tube; it measures about 25 by 15 by 8 mm. It is cystic; the contents are grumous. Microscopically it consists of very loose fibrous tissue with cyst-like spaces, which have not now any epithelia lining; it is much altered by time; probably, however, it is of the same nature as the preceding, but with a certain amount of mucous degeneration. (MS. Notes, J.H.T., p. 139.)

UTERINE MYOMATA ; "FIBROIDS."

45.30. Myomata of the Uterus. Interstitial.*Hunterian. CC. 67a.*

The uppermost of "three sections transversely of the same uterus, scirrhus and enlarged to the size of a gravid uterus at six months; there was a foetid discharge and hectic fever; it was in a milliner about forty-five, who was also a maid." This specimen consists of the fundus of the uterus. In section it shows several small interstitial myomata, from 1 to 2.5 cm. in diameter. It is figured in Matthew Baillie's *Engravings*, Fasc. IX., Pl. II., fig. 2, and described as "transverse section of a scirrhus uterus." No. 67*b* is absent; No. 67*c* is now No. 45.83; it shows the cervix much enlarged and its cavity filled with a ragged growth, which microscopic examination shows to be an ulcerating epithelioma of the cervix, which explains the discharge. The cavity of this specimen is enlarged and contains a quantity of ulcerated looking tissue similar to the tumour in the cervix. (MS. Notes, J.H.T., p. 138.)

45.31. Myomata of the Uterus. Interstitial.*Hunterian. CC. 70d.*

Uterus, with the posterior wall of the bladder; a cut has been made into the front of the body of the uterus, and the anterior part turned up, showing in section a myoma, which, with one or two other small ones, had produced a considerable enlargement of the organ.

45.32. Myoma of the Uterus. Interstitial tending to become Subserous.*Hunterian. CC. 66.*

Uterus and appendages, the uterus split from back to front, showing a myoma, about 3 cm. in diameter, growing outwards in the posterior wall of the fundus uteri.

45.33. Myoma of the Uterus. Subserous.*Hunterian. CC. 65a.*

Uterus and vagina laid open from behind, showing a myoma about 2 cm. in diameter, projecting considerably from the wall of the former, and only slightly embedded in it.

45.34. Myoma of the Uterus. Subserous.*Hunterian. CC. 64.*

Posterior half of uterus with appendages, showing a globular pedunculated myoma about 2.5 cm. in diameter. It is split and the two halves laid out on the back of the uterus. Above is seen another much smaller myoma, also attached by a narrow neck. "Ovaria externally convoluted like the brain of some small quadruped."

45.35. Myomata of the Uterus. Pedunculated and Subserous.

Uterus showing a pedunculated myoma as large as a pigeon's egg in the neighbourhood of the insertion of the left round ligament of the ovary. Also a subserous myoma about 2 cm. in diameter projecting slightly from the front of the fundus.

45.36. Myoma of the Broad Ligament. *Hunterian. CC. 114.*

Part of the fundus of the uterus, with the appendages of both sides, showing a myoma as large as a hen's egg hanging from the back of the broad ligament, just below the Fallopian tube, and just clear of the uterus. Probably it originated in the uterus and gradually grew out into its present position. There is a small myoma springing from the top of the fundus uteri about 1.5 cm. from the large tumour. The section of the large tumour shows beautifully the characteristic whorled appearance of the tissues of a myoma.

45.37. Myomata of the Broad Ligament and Uterus.*Hunterian. CC. 65b.*

Part of uterus with the appendages of the left side, showing one half of a myoma about 4 cm. in diameter embedded in the anterior part of the broad ligament close to the side of the uterus. There is also half of a subserous myoma seen in the back of the fundus uteri.

45.38. Myoma of the Uterus. Submucous.*Hunterian. CC. 75.*

"Uterus and vagina slit open : a polypus of the size of a very

large walnut appears in the fundus; is almost perfectly spherical and internally spongy." "The substance of the fundus uteri rendered thin by distension in consequence of the growth of the tumour, but sound in its structure." On slicing a portion of the cut surface the tissue presents the characteristic whorled appearance of a myoma, but is traversed by an unusual number of blood vessels, whence its spongy appearance. (Figured in Matthew Baillie's *Engravings*.) The cervix uteri is normal. (MS. Notes, J.H.T., p. 140.)

45.39. Myoma of the Uterus. Submucous grown out into Vagina. *Hunterian. CC. 76.*

Half of uterus and vagina, with a large myoma, divided by sagittal section to show the relation of the parts. The tumour springs by a broad base from the posterior wall of the fundus uteri; the cervix envelopes its neck; and the distended vagina encloses its body, which has been about the size of a child's head at birth. The appearance of the cut surface is typical of the myoma or fibro-myoma.

45.40. Myoma of the Uterus. Submucous grown out into Vagina. *Hunterian. CC. 77.*

The other half of the preceding. It shows the breadth of the neck much better. In the old catalogue it is remarked that "no operation could here succeed." The only operation at that time was strangulation by ligature, which would not have been possible; but it certainly appears that it might have been shelled out, or the uterus extirpated.

45.41. Submucous Myoma distending the whole Uterus. *Hunterian. CC. 78.*

"Uterus dilated by a pyramidal polypus to the size of a gravid uterus at five months; vagina and uterus opened; the polypus adheres by its base to the fundus uteri, but it is not connected with the uterus anywhere else, and its apex is just pushing through os tincae." The uterus is distended as if by pregnancy, the cervix is shortened, and the os dilated to the size of a shilling, presenting an appearance not unlike that which would be met in an early stage

of labour at full time. The section of the tumour presents the usual appearance of a myoma.

45.42. Myoma of the Uterus. Pedunculated and Lying in the Vagina. *Hunterian. CC. 74.*

"Uterus and vagina slit open; shows a polypus as large as a child's head at birth, hanging by a peduncle not above one-eighth of an inch diameter, and which therefore might easily have been extirpated." (The peduncle is fully one-fourth of an inch in diameter.) The cervix is everted and dilated, and one side of it above the peduncle is visible, presenting the rugose appearance characteristic of the virgin uterus. The specimen is figured in Matthew Baillie's *Engravings*, Fasc. IX., Pl. IV., fig. 1, as "a polypus of a considerable size, which had passed from the cavity of the uterus into the vagina."

45.43. Myoma of the Uterus. Pedunculated and Distending the Vagina. *Hunterian. CC. 74a.*

"Uterus and vagina slit open nearly their whole length; shows a polypus larger than a child's head at birth, filling up vagina; it hangs from the fundus uteri by a peduncle, as thick as one's finger, and about an inch and a half in length. Dr. Hunter attempted to tie it several times, without success, chiefly from its great size: at an earlier period there would have been no difficulty in tying it." The vagina is enormously distended, but is narrow towards the orifice, through which there is no projection of the tumour. The labia and perinaeum not preserved.

45.44. Myoma of the Uterus. Subserous; Pedunculated; in the Abdomen. —

The specimen consists of the uterus, which is not much above the normal size, and a myoma considerably larger than a child's head at birth, attached by a rounded pedicle about 2 cm. in diameter to the centre of the top of the fundus. The uterus is cut open, showing in section several small myomata, and in the cavity a polypus similar to Nos. 45. 26 to 45. 29. The Fallopian tubes and broad ligaments are spread out round either side of the base of the tumour. Nothing is known of the history of the specimen.

45.45. Large Myoma of the Uterus. Subserous; Pedunculated. *Hunterian. CC. 44.*

“A very uncommon specimen of disease, not only from size, but from situation. The uterus appears perfectly healthy at the cervix, and the Fallopian tubes and ovaria are in their natural state; there arises from the fundus uteri an uncommonly large scirrhus substance, consisting of two irregularly rounded masses joined together by a narrow neck, and feeling almost like the substance of the gravid uterus; the smaller of these rounded masses is next the uterus; the larger is at a greater distance, and must have occupied a great part of the abdomen; there is a section through the whole mass, exhibiting the true scirrhus appearance; the largest mass is about twenty-one inches round, and the whole weighing five pounds six ounces.” The smaller mass seems to be the fundus uteri converted into a mass of myomata, and the larger is a huge myoma.

45.46. Myomata of Uterus. *Hunterian. CC. 112.*

“Not described in Hunterian MSS.” One half of uterus greatly enlarged and irregular from the presence of numerous myomata, which are mostly interstitial. The enlargement affects almost wholly the fundus; it is fairly even on all sides of the cavity, which is distorted and considerably increased in length (measuring 15 cm.) and in width. Of the 15 cm. only 3 cm. is cervical cavity. Several pedunculated myomata project externally.

DEGENERATIVE CHANGES IN UTERINE MYOMATA.

45.47. Calcification of Uterine Myoma. *Hunterian. CC. 57b.*

Uterus laid open, showing a myoma about the size of a walnut, split and the two parts turned aside. Shows a slight degree of calcification, which takes the form of yellow stony nodules scattered through its central parts. (MS. Notes, J.H.T., p. 119.)

45.48. Calcification of Uterine Myoma. *Hunterian. CC. 57c.*

“The uterus opened, from a woman in Charles Street, whose cystic duct is described as ulcerated from a gall stone, as large as a walnut, and falling into the abdomen. (*Vide* No. 58. U, now No. 38. 22.) Cavity of the uterus considerably enlarged, and a

pendulous polypus from the fundus seen also : both ovaria scirrhus ; one is ossified quite, and both as large as oranges ; os tincae makes here a round hole, not an oval : she was reputed indeed as a maid ; about 50." The ovaries are absent, and what are described as ovaries are two myomata projecting before and behind the uterus. One of these is almost completely calcified, like a stone ; the other shows here and there points of calcification. The cavity of the fundus was distended by a mucous polypus, which is turned upwards out of it.

45.49. Myoma of the Uterus. Externally Calcified, internally Softening. *Hunterian. CC. 69.*

"Uterus and vagina slit open : a large ossified tumour about the size of a child's head at birth, appears to have grown in the substance of the fundus ; internally (for it is almost divided into two) it seems to have been cellular, and to have contained a fluid." The tumour is a myoma, a thin outer shell of which is completely calcified. Around the mass is a sac which is identified as the uterus by the presence of the cut ends of the Fallopian tubes and broad ligaments at its sides. The uterine walls have been ulcerated to such an extent that the tumour is almost free in its cavity, and the walls are very thin, in one place actually perforated. There is a considerable cavity in the tumour due to softening and breaking down, from cutting off of the blood supply.

45.49a. Large Degenerating Myoma—Fibro-cystic Tumour of the Uterus.

Presented by Dr. T. K. Dalziel, 1898.

One half of a large tumour of the uterus successfully removed through the abdomen by amputation about the level of the os internum. The growth is about as large as the average adult human head. It consists of two rounded interstitial myomata distending the anterior wall of the uterus, the cavity of which is bent backwards beneath the growth and somewhat enlarged. There are numerous irregular cavities of various sizes, which had mucous contents. Microscopically it is a myoma, and the cysts are cavities produced by degenerative changes. Above it hang the Fallopian tubes and ovaries—to all appearance normal.

45. 50. Sloughing Myoma of the Uterus. *Hunterian. CC. 107.*

One half of uterus and vagina, and half of a large myoma springing from the fundus uteri. The tumour has been a solid mass about the size of a child's head at birth, attached to the uterus by ragged strands of fibrous tissue. Here and there among those strands are little balls, which are found on microscopic examination to be extremely sclerosed balls of fibrous tissue with remains of a few muscle cells; these have preserved their structure sufficiently for purposes of identification, while the softer parts of the myoma have undergone complete disintegration. (MS. Notes, J.H.T., p. 141.)

45. 51. Sloughing Myoma of the Uterus. *Hunterian. CC. 116.*

Other part of the preceding.

MYOMATA REMOVED BY OPERATION BY WILLIAM HUNTER.

45. 52. Uterine Myoma removed by Operation.

Hunterian. CC. 79.

"A polypus got by extirpation from the living subject; cut in two; it is now white, and free from blood, internally spongy, and inclined to the nature of ligamentous fibre; size of one's fist." This and the succeeding are all of the variety submucous myoma become pedunculated. From this circumstance they became accessible to operation by ligature of the pedicle per vaginam.

45. 53. Myoma of the Uterus removed by Operation.

Hunterian. CC. 81.

Similar to the preceding, but smaller.

45. 54. Myoma of the Uterus removed by Operation.

Hunterian. CC. 82.

About 5 cm. in diameter. There are traces of calcareous infiltration externally.

45.55. Myoma of the Uterus removed by Operation.*Hunterian. CC. 83.*

Another similar "polypus" of very dense texture, and with part of the peduncle remaining. (Figured in Matthew Baillie's *Engravings*, Fasc. IX., Pl. IV., fig. 2.)

45.56. Myoma of the Uterus removed by Operation.*Hunterian. CC. 83a.***45.57. Myoma of the Uterus removed by Operation.***Hunterian. CC. 87.***45.58. Myoma of the Uterus removed by Operation.***Hunterian. CC. 89a.*

"A bloody polypus of the uterus, extracted by ligature by Dr. Hunter; about the size of a pear, with a peduncle an inch long and thick as a goose quill."

45.59. Myoma of the Uterus removed by Operation.*Hunterian. CC. 91.***45.60. Myoma of the Uterus. Sloughing. Removed by Operation.***Hunterian. CC. 92.*

"Procured by extirpation from the living subject; very bloody, and nearly the size of one's fist."

45.61. Myoma of the Uterus. Sloughing. Removed by Operation.*Hunterian. CC. 93.*

Similar to the preceding.

45.62. "Polypus" of the Uterus. Removed by Operation.*Hunterian. CC. 91.*

Probably a softened and sloughing myoma of the softer variety.

45.63. "Polypus" of the Uterus. Removed by Operation.*Hunterian. CC. 84.*

A ragged mass of fibrous tissue, probably the remains of a fibro-myoma.

45.64. "Polypus" of the Uterus. Removed by Operation.*Hunterian. CC. 88.*

Similar to the preceding; smaller and more ragged.

45.65. A Surgical Fraud.*Hunterian. CC. 96.*

"A very bloody placenta with a portion of membrane which had been fraudulently introduced into the uterus, and afterwards extracted by a practitioner as a real polypus."

*(b) Malignant Tumours of the Uterus, Vagina,
and Vulva.*

45.a66. Warty Epithelioma of the Vulva.*Dr. Laurie, Greenock. 1898.*

The specimen consists of a labium minus considerably enlarged by the presence in it of a well-defined tumour of flattened oval shape about the size of a filbert ($3 \times 2 \times 1$ cm.). The growth is sessile, implanted in and distending the labium; on the two sides and free edge it presents a warty appearance. In section it shows a stem and branching papillae of connective tissue sheathed with a thick layer of stratified epithelium, which is distinguishable from the connective tissue by its denser and more homogeneous appearance. Under the microscope this epithelial covering of the papillae is seen to be very thick, and in places appears to be growing down into the connective tissue and infiltrating it rather than to be borne up on the papillae; in certain parts there are laminated capsules (epithelial pearl bodies). From the last two characters it is to be regarded as a warty epithelioma rather than a simple wart (papilloma). (Presented by the West of Scotland Clinical Research Laboratory. Report No. 2/165.)

45.66. Carcinoma of the Cervix Uteri. *Hunterian. CC. 98.*

"Vagina and uterus slit open from behind; os tincae, cervix uteri, and upper part of vagina destroyed by an ulcer; commonly termed cancer of the uterus." Microscopic examination shows that it is a carcinoma of the cylinder-celled glandular type. (MS. Notes, J.H.T., p. 126.)

45.67. Carcinoma of the Cervix Uteri, fungating into the Bladder. *Hunterian. CC. 100.*

"Vagina and uterus slit open from behind; bladder also opened from before; ulceration also smaller about os tincae, about the size of a shilling; same appearance in the bladder in the side next uterus." There is comparatively little tumour and ulceration about the os uteri, but the ulcer in the floor of the bladder is large and fairly prominent. Microscopic examination only shows that it has been a highly cellular carcinoma; it is very much degenerated. (MS. Notes, J.H.T., p. 127.)

45.68. Carcinoma of the Uterus with Extensive Ulceration. *Hunterian. CC. 57a.*

"Uterus, vagina, and bladder of a woman from the dissecting room, all laid open; cervix uteri and upper part of vagina all cancerous and ragged; a large opening also between vagina and bladder, sufficient to pass a walnut." The ureters pass right into masses of cancer-infiltrated tissue; their orifices appear to be intact; marked with bougies. The tissues are extremely degenerated through time, but show sufficient to confirm the old diagnosis of a malignant ulceration. (MS. Notes, J.H.T., p. 118.)

45.69. Carcinoma of the Cervix Uteri. Advanced.*Hunterian. CC. 101.*

Posterior half of uterus and vagina, showing the above. There is extensive ulceration, almost the whole cervix and the upper part of the vagina being destroyed.

45.70. Carcinoma of the Cervix Uteri. Advanced.*Hunterian. CC. 101a.*

The whole uterus with part of the vagina. The bladder and

rectum are dissected away, showing that the disease has destroyed the greater part of the cervix, and the vaginal walls both before and behind. On either side is a mass of infiltrated glands, that on the right extending up into the broad ligament.

45.71. Carcinoma of the Cervix Uteri. Advanced.

Hunterian. CC. 102.

Another example of advanced carcinoma of the cervix of the uterus, which has caused widespread destruction of the vagina and cervix, and is fungating into the bladder.

45.72. Carcinoma of the Cervix Uteri. Advanced.

Hunterian. CC. 102a.

A specimen somewhat similar to the preceding, but with most of the ragged tumour tissue scraped away, to show the perforation of the bladder.

45.73. Carcinoma of the Cervix Uteri. Advanced.

Hunterian. CC. 104e.

Uterus, vagina, and part of rectum, the vagina opened in front, showing extensive ulceration of the cervix and vaginal walls, with extensions of tumour into the broad ligament and recto-vaginal septum.

45.74. Carcinoma of the Cervix Uteri. Perforation into Peritoneal Cavity.

Hunterian. CC. 106.

The uterus, with part of the vagina and bladder, showing a comparatively small growth, which has affected the vagina very little, yet has eaten through into the bladder in front, and from behind can be seen to have almost entirely destroyed the cervix, and opened into the recto-vaginal pouch of the peritoneum.

45.75. Carcinoma of the Cervix Uteri. *Hunterian. CC. 106a.*

Uterus, vagina, and part of the bladder, showing considerable ulceration of the posterior wall of the vagina, fungation into the bladder, and large masses of affected glands at the sides of the cervix and extending into the broad ligaments. "From a woman in the dissecting room, 1782."

45.76. Carcinoma of the Cervix Uteri. *Hunterian. CC. 101b.*

The specimen consists of a cervix uteri which has grown into a large ragged ulcerating tumour. The vagina, which is but little ulcerated in comparison to the preceding specimens when the great size of the tumour is considered, is turned up like a collar round the neck of the tumour.

45.77. Carcinoma of the Cervix Uteri. Large Tumour.

Hunterian. CC. 104.

The contents of the pelvis divided in median antero-posterior section, showing a huge ragged tumour of the cervix uteri, with extensive infiltration of surrounding tissues. The shape of the tumour is pyramidal; the vaginal surface, which forms the base, is roughly circular, and measures fully 12 cm. (nearly 5 inches) in diameter. The growth has distended the vagina without involving its walls to any great extent; the ulceration, as in the preceding, affecting the face of the tumour, and not much the edge near the vaginal wall. The specimen also shows how, even in a very late stage, the body of the uterus may be very little involved. The broad ligaments, bladder, rectum, and uterus are all matted together; a considerable portion of the upper part of the tumour appears to be infected lymphatic glands. (MS. Notes, J.H.T., p. 142.)

45.78. Carcinoma of the Cervix Uteri. *Hunterian. CC. 104a.*

The other part of the preceding.

45.79. Carcinoma of the Cervix Uteri. *Hunterian. CC. 104d.*

Right half of uterus and vagina, showing the above. The tumour is of considerable size, fully 6 cm. in diameter, and affects chiefly the posterior half of the cervix. There is great ulceration of the large mass which is situated posteriorly, but this is confined to the face turned towards the cavity of the cervix, and does not pass on to the vaginal wall. The smaller anterior portion, while showing complete replacement of the muscular tissue by tumour, is still enclosed in unbroken mucous membrane. A mass of enlarged glands, about the size of a walnut, and several smaller ones, carefully dissected, hang from the broad ligament. The epithelial elements have fallen out, and the tumour presents a peculiar spongy appearance. (MS. Notes, J.H.T., p. 143.)

45.80. Carcinoma of the Cervix Uteri. *Hunterian.*

The other half of the preceding; not numbered. There is a very large mass of glands at the side of the cervix. Two coils of intestine adhere to the fundus.

45.81. Carcinoma of the Cervix Uteri. *Hunterian.*

One half of uterus, showing the cervix converted into a large solid-looking tumour. The whole organ has a pyramidal shape, the fundus being the apex. The base is 6.5 cm. wide. The glands alongside the cervix are greatly enlarged; the whole forms a mass which must have completely filled the pelvis. The posterior lip of the os is more affected than the anterior, being enormously thickened, and presenting a large ulcerated surface looking downwards. The tumour extends all round the cervix; the anterior lip is considerably thickened; in it at least the portis vaginalis is not replaced by tumour, and its lower surface is not ulcerated. Nowhere is there any extension to the vaginal wall. It is a carcinoma, consisting of large masses of polygonal cells, in which are occasionally seen bodies like the laminated capsules of an epithelioma. (MS. Notes, J.H.T., p. 136.)

45.82. Carcinoma of the Cervix Uteri.

From Dr. Allen Thomson's Collection.

The whole uterus, with the posterior part of the vulva and vagina, and a small piece of the bladder, with bristles in the ureters, showing a tumour of the cervix, which, in contrast to the preceding, has grown out into long ragged polypoid masses projecting even beyond the vulva. The tissue is so much degenerated that the carcinomatous nature of the growth can only be conjectured from the arrangement of the fibrous tissue, and from its naked-eye characters. (MS. Notes, J.H.T., p. 135.)

45.83. Carcinoma of the Cervix Uteri. *Hunterian. CC. 67c.*

The cervical portion of the uterus described as No. 45.30. The cervix is enlarged, and its tissues are replaced by malignant growth. The cavity is enlarged and ragged, but the os still preserves its

transverse character, and the ulceration is confined within its lips. Microscopically, the tumour is a carcinoma; it presents characters similar to those of No. 45.81, parts of some of the cell masses simulating epithelioma. It is much altered through time. For the history of the case, see No. 45.30. (MS. Notes, J.H.T., p. 138.)

45.84. Carcinoma of the Body of the Uterus.

Hunterian. CC. 115.

"Not described in Hunterian MSS." Uterus enlarged to about the size of the pregnant organ at four months; split open from behind. Externally, it is thrown into rounded nodules which are masses of tumour, and, internally, the cavity is large and irregular, and its surface rough and ragged. The growth affects the entire body of the uterus; the cervix is hypertrophied, but the tumour tissue seems to stop above the os internum. Microscopically, it is an extremely cellular carcinoma. The epithelial processes have infiltrated the whole thickness of the wall of the uterus, and have destroyed most of the muscle. (MS. Notes, J.H.T., p. 134.)

(c) Innocent Tumours of the Ovaries and Fallopian Tubes.

45.85. Fibro-myoma of the Ovary.

Hunterian. CC. 55a.

Left Fallopian tube and broad ligament, with one half of a myoma of the ovary hanging from it. The tumour has been of spherical shape, and measures 8 cm. in diameter. The Fallopian tube lies above it, connected with it by the mesosalpinx and the lower end of the fimbriated extremity; the round ligament of the ovary descends to the top of the tumour, and at its attachment appear in section the remains of the ovary. The inner part of the broad ligament, as a whole, forms a distinct pedicle to the tumour. The preparation is injected red, and, whereas the Fallopian tube and broad ligament appear highly vascular, the cut surface of the tumour presents the usual white glistening fibrous appearance with hardly a trace of the injection. The specimen is figured in Matthew Baillie's *Engravings*, Fasc. IX., Pl. VII., fig. 2, and is described as a "scirrhus ovarium."

45.86. Ovary showing Cavities of Graafian Follicles.*Hunterian. CC. 52.*

"An ovarium cut open to show cells of the size of common peas, containing jelly, and forming the basis of future dropsy (of the ovarium)." The cells are simply the cavities of normal Graafian follicles in various stages of development, and the statement that "they form the basis of future dropsy" is warranted only in so far as it is the case that the simple cysts like Nos. 45.87 to 45.92 do originate from the Graafian follicles. William Hunter, speaking of ovarian cysts (in the *Midwifery Lectures*, MS. R.C.S. Eng., 42, c. 31) says, "it is so exceedingly common to meet with hydatids in the substance of the ovarium that I presume there are many of them which have no tendency to increase, and which would never produce the dropsy just now described." Compare succeeding specimens.

45.87. Simple Cystic Ovary.*Hunterian. CC. 45d.*

Broad ligament and Fallopian tube showing a section of the ovary converted into cysts, which are partly filled with a gelatinous fluid. The ovary is about the size of a filbert.

45.88. Simple Cystic Ovary.*Presented by Dr. J. K. Kelly, 1897.*

Halves of both ovaries "removed from an unmarried patient of 31, who has suffered for many years from menorrhagia, and of late also from paraplegia and nystagmus. Pelvic pain was never a marked symptom, but was occasionally present on the left side, and was associated with some varicosity of the veins of the left leg." The cystic ovary is nearly as large as a hen's egg, measuring 5.3 by 3.5 cm., broadest near one end. Both ends are occupied by cysts, the largest about the size of a marble, the smallest about 1 cm. in diameter. They have very thin walls, and, microscopically, are found to have only the merest traces of an epithelial lining, from which it appears probable that they would never have become much larger. The other ovary is a healthy normal organ, showing numerous Graafian follicles in various stages of development. Between the two organs the stages of development of the Graafian follicles into simple cysts can be clearly traced.

45. 89. Simple Cyst of the Ovary. *Hunterian. CC. 51.*

Fallopian tube, slit open, with a cyst of the ovary (a "dropsy of the ovarium" as it was called in Hunter's time), about 5 cm. in diameter, hanging from it by the fimbriated process.

45. 90. Simple Cyst of the Ovary. *Hunterian. CC. 50c.*

Right broad ligament suspended by the Fallopian tube, which is stretched horizontally above. Hanging from it by the mesosalpinx, and forming the lower part of the specimen, is a simple cyst of the ovary about the size of a hen's egg. The cut edge of the broad ligament, with the mass of ovarian veins in section, injected with vermilion, is seen above the cyst and indicates which is the front of the specimen.

45. 91. Simple Cyst of the Ovary. *Hunterian. CC. 45.*

Uterus, its anterior wall removed, and the appendages of the left side, showing the ovary converted into a large cyst, which is lobulated externally, having evidently originated from several follicles. The specimen is hung by the uterus and left round ligament, in such a way as to show how the cyst hangs out clear from the back of the broad ligament. The Fallopian tube is separated by the width of the mesosalpinx from the attachment of the tumour to the back of the broad ligament. Contrast the relations of this ovarian cyst with those of No. 45.113, which is a parovarian cyst.

45. 92. Simple Cyst of the Ovary. *Hunterian. CC. 49.*

A very similar cyst laid open on one side, showing the thin transparent walls, and the cavity loculated from the presence of incomplete partitions, which indicate its origin from a number of follicles. On the outside just below the opening, is a small cyst, which does not communicate with the general cavity.

45. 93. Portion of Colloid Cystoma (Adenoma) of the Ovary.*Hunterian. F. 6.*

A section from the exterior of a specimen of the above class of tumour, showing the characteristic arrangement of the cysts.

Formerly placed in the old series F as an example of "human cellular membrane from a tumour, showing the cells as distended with a morbid gelatinous fluid." The microscope, however, shows that the so-called cells are cysts lined with epithelium originating from glandular tissue, and therefore not at all analogous to the spaces of the areolar tissue to which the name cells was applied by Hunter and his contemporaries. The specimen has accordingly been removed to its proper place among tumours.

45. 94. Portion of Colloid Cystoma (Adenoma) of the Ovary.

Hunterian. CC. 46a.

"Portion of an encysted dropsy of the ovarium, size of an orange, full of a glairy fluid which coagulates in spirits, but was originally transparent." The contents have been removed. Similar to the preceding in nature.

45. 95. Portion of Colloid Ovarian Cystoma. Adhesion to Diaphragm.

Hunterian. CC. 46b.

"A very large portion of the same diseased ovarium; the jelly scooped out; the different cysts, many of them communicating with one another, exposed: on one side is seen a portion of the diaphragm, with a very large ossification in it; also a portion of the lungs, showing that the ovarium had reached so high." It must have been a very large cyst. The adhesion and portion of diaphragm hang down behind. The "ossification" looks like a calcareous plate on the upper surface of the diaphragm, probably connected with old disease of the pleura.

45. 96. Bilateral Cystic Transformation of the Ovaries. Uterine Adenomata.

Hunterian. CC. 120.

(Not described.) Anterior portion of uterus with appendages, showing, on the right, part of a large cyst with thin walls in which are embedded numerous smaller cysts, evidently derived from the right ovary. The left ovary is also cystic; about the size of a walnut. In the cavity of the uterus are a number of small adenomata.

45.97. Portion of Large Ovarian Cystoma. Stretching of Fallopian Tube.*Hunterian. CC. 50a.*

“Uterus, adult, slit open; left ovarium was dropsical to a very large size; a portion still remains and consists of a jellying fluid in large cells.” The specimen, as regards the tumour, is not good, but it shows a remarkable elongation of the Fallopian tube, which measures 30 cm. (about 12 inches). The tube has unfortunately been dissected clear, and its relations thereby destroyed; it hangs down beside the remains of the tumour, which must have been a very large one. The uterus is stretched and twisted to one side.

45.98. Portion of a Cystoma of the Ovary. *Hunterian. CC. 50b.*

One of the “cells” from the preceding, cut open to show the coagulated contents.

45.99. Papilloma of the Ovary.*Hunterian. CC. 90.*

The specimen, formerly described as a “very loose and very bloody polypus of the uterus,” turns out on microscopic examination to be of the nature of a papilloma of the ovary. It has been partly split and the halves laid back, so as to show the interior of the cysts. It has been about the size of a goose’s egg; it is composed of cysts, of very irregular shapes and sizes, separated by fibrous walls, which are from .5 to 2 mm. thick, in some parts smooth, in others covered with numbers of small papillae. (MS. Notes, J.H.T., p. 124.)

45.100. Papillomatous Cyst of the Ovary.*Hunterian. CC. 45c.*

The anterior half of the body of the uterus with the appendages of both sides. The right ovary is cystic, and rather larger than a pigeon’s egg. The largest cyst, projecting outwards beyond the end of the Fallopian tube, was opened with a view to ascertaining its nature, when it was found to contain a clear fluid and a soft yellowish coagulum, on removing which two small clumps of warts were discovered. One of the other small cysts also contains warts. The broad ligament is spread out to show the relations of the cyst, which is clearly of ovarian origin. There are two small subserous myomata projecting from the surface of the uterus.

45.100a. Ruptured Papilloma of the Ovary.

Presented by Dr. T. K. Dalziel, 1898.

The specimen consists of one half of a tumour rather larger than the foetal head at term. "It was removed by Dr. Dalziel from a patient, aet. 54, in February, 1898. Seven years before a similar tumour of the other ovary was excised. On both occasions general peritoneal infection had occurred, associated with extreme ascites. After the operation complete recovery took place; evidently the secondary growths disappeared." The tumour was of blunt oval shape flattened from side to side in one direction. In the middle of one of the flattened sides there is a concavity—a sort of hilum, in which lies the ovary. The lower (as it hangs) third of the specimen, below the hilum, is a cauliflower-like mass of papillomata. The upper two thirds are enclosed in a thin tough membranous capsule, which is ruptured here and there allowing smaller cauliflower-like masses to protrude. In the section the ovary is recognized, consisting of a mass of small Graafian follicles and a simple cyst rather larger than the ordinary follicle, projecting into the hilum between the upper unruptured part of the cyst and the cauliflower-like mass below. The broad base of the ovary on the tumour is a mass of dense fibrous tissue and blood-vessels, apparently a hypertrophy of the proper hilum of the ovary. From this vascular fibrous mass as centre and from the interior of the capsule all round there rise stems of fibrous tissue on which grow the papillomata. These growths are packed tightly together in the cyst, embedded in a little mucus. Where the cyst wall is wanting they grow more luxuriantly on longer stems and less tightly packed.

45.101. Dermoid Cyst of the Ovary.

Hunterian. CC. 53a.

"Posterior half of the uterus with the right ovarium enlarged to the size of a child's head at birth, internally full of suet and hair." There is present only one half of the tumour, which has been divided to show its contents. The main mass of the tumour is a large thin walled cyst full of fat and hair. At the base of this is seen the rest of the ovary converted into small cysts with similar contents. From the wall of the large cyst is seen growing a tuft of reddish hairs.

45.102. Dermoid Cyst of the Ovary. *Hunterian. CC. 53.*

Other part of the preceding. In the old catalogue it is remarked that there is "no foetus nor bone," apparently an allusion to the old idea that these tumours were the result of parthenogenesis or ordinary conception, and represented the remains of an imperfectly formed child. See also under No. 45.109.

45.103. Contents of Dermoid Cyst of the Ovary.*Hunterian. CC. 54b.*

A ball of hair and fat about 6 cm. in diameter, from a tumour similar to No. 45.101.

45.104. Hair Ball from a Dermoid Cyst of the Ovary.*Hunterian. CC. 55.*

"A tuft of hair from an ovarium, very considerable."

45.105. Hair Ball from a Dermoid Cyst of the Ovary.*Hunterian. CC. 56.***45.106. Dermoid Cyst of the Ovary. Bilateral.***Jeffray Collection.*

Uterus and appendages showing both ovaries converted into dermoid cysts. The right, rather larger than a hen's egg, is incised to show the contents, which are of the usual character—yellow fat of buttery consistence mixed with hairs. The left has been divided and the contents removed to show the character of the cyst wall. The cyst wall is generally thin, smooth, and hairless. At the attachment of the tumour to the broad ligament is a thick mass, the remains of the ovary, which in section shows a couple of small dermoid cysts, and an irregularly-shaped concretion, hard and translucent like horn, black in colour, but having a reddish tint when looked through. The surface of this part of the tumour which looks into the main cyst is rough, porous, and papillated, and shows one or two small tufts of reddish-brown hairs.

45.107. Dermoid Cyst of the Ovary. *Hunterian. CC. 54.*

Another tumour of the same class, incompletely bisected and both halves mounted together. As usual, there is a main cyst (in the contents of which the hairs predominate), with the remains of the ovary at one side, forming a sort of hilum. In this appears another cyst containing an irregular mass of bone; also the wall of the main cyst in this region is decidedly skin-like in character, and beset with abundant fine brown hairs. The bulk of the hairs grow from this region, but even the thin parts of the cyst wall have a few hairs on them here and there.

45.108. Dermoid Cyst of the Ovary containing Teeth.*Hunterian. RR. 374.*

This specimen was originally in the Gravid Uterus series, where it was described as "A monstrous production of the ovarium, consisting of a jaw, some teeth, some fat, and hair." It is part of a large dermoid. As it hangs it shows, below, a mass of the usual fat and hair, above which is an irregular mass like part of a jaw. The surface of the sides of this is skin-like, porous, papillated, and covered with dark brown hairs; its apex is an irregular gum with two fully erupted teeth, and a third one contained in a regular dental follicle; compare specimens of developing teeth in Series 29. Above, there is a patch covered with hairs, and resembling the skin even to the extent of being brown pigmented in parts.

**45.109. Dermoid Cyst of the Ovary containing Teeth.
Ulceration into Rectum.***Hunterian. RR. 375.*

Described as "some teeth in the rectum, formed most probably in the ovarium, and which had ulcerated its way into the rectum; the uterus on the other side appears to be of the natural size and never to have contained any ovum: what is remarkable is that the woman (aged about nineteen), in whom this preparation was found, appeared to have the hymen uninjured. (Dissecting room.)" As indicated above, the specimen consists of part of the rectum slit open, hanging into the cavity of which are a couple of masses similar to what is described in the preceding specimen, containing numbers of beautifully formed teeth—incisors, canines, bicuspid, and molars. The root of one of the molars has three

distinct fangs. The other side of the preparation shows half of the uterus, part of the vagina, and the appendages of both sides twisted back and matted together with the rectum, in a manner which strongly suggests, and doubtless did suggest to William Hunter, the above view of the source of the teeth. There are also portions of one or two small abscess cavities.

(d) *Malignant Tumours of the Ovaries, Broad Ligaments, and Fallopian Tubes.*

45.110. Carcinoma of the Ovary. *Hunterian. CC. 45b.*

Part of a large tumour, on the side of which, near its upper end, is perched one half of the uterus, while part of the left Fallopian tube extends out over the tumour, attached to it by the mesosalpinx, which is there about 2 cm. broad. The tumour mass clearly belongs to the posterior aspect of the broad ligament, and springs from the position of the ovary. It is altogether below the level of the fundus uteri; its long diameter lies nearly in the same direction as that of the uterus, and measures 19 cm. In breadth it measures 8 cm. What was its original position in the body and its relation to the uterus is unknown. It is contained in a well-defined thin fibrous capsule, which is smooth externally. There have been several largish cysts, but they have collapsed, and the rest of the tumour is fairly solid, with only minute cysts. Microscopic examination shows the tissue to be fairly well preserved. Where it is least cystic it presents the character of a glandular carcinoma, with small fairly regular alveoli lined with short columnar epithelium. As the alveoli get larger they are found filled with polygonal epithelial cells, and lastly, there are cysts containing only debris like mucus and a few nuclei. It is a carcinoma of the ovary. (MS. Notes, J.H.T., p. 114.)

45.111. Carcinoma of the Ovary. *Hunterian. CC. 46.*

A large mass, of irregularly rounded shape, about 17 cm. in its largest diameter, being part (the larger part probably) of a tumour of the ovary. The uterus, as in the preceding, lies close to the side of the mass and in front of it, the round ligament of the ovary being visible in the angle between tumour and uterus. The Fallopian tube, after passing out a short way clear

of the tumour, dips down and is lost in it. The tumour is enclosed in a thin smooth fibrous capsule, the surface of which certainly looks like peritoneum. From this and from the relation of the Fallopian tube to the tumour it appears probable that it lies between the layers of the broad ligament. Of its position and relations in the body nothing is known. It is a fairly solid tumour, but in section shows small cysts; also necrotic patches here and there. Microscopically it is a carcinoma, somewhat similar to the preceding, but hardly so like gland tissue. It is very badly preserved. (MS. Notes, J.H.T., p. 115.)

45.112. Carcinomatous Cystic Tumour of the Ovary.

Hunterian. CC. 50.

"A large portion of dropsical ovarium, in most places become solid, spongy, and cellular." The specimen appears to be part of a tumour of ovoid shape, measuring about 14 by 8 cm. Externally it is nodulated, the nodules of various sizes from 2 to 4 cm. in diameter, some of them evidently cysts with thin translucent walls, like those of an adenoma, but others as evidently are solid. The cut surface shows the upper part mostly a ragged cavity; the lower part is solid and lobulated, in texture fibrous, with the spaces between the fibres occupied by rather translucent solid material. The cysts are nearly all on the upper part of the tumour, the solid nodules on the lower. Microscopically it is a carcinoma; a section of the solid part consists of a fibrous stroma, varying in amount in different parts of the section, with alveoli which are filled with masses of cells, which are very badly preserved, but are distinctly epithelial in character. The masses appear to have been solid processes of cells, rather than gland-like structures. (MS. Notes, J.H.T., p. 117.)

(e) *Tumours of the Parovarium, Paroophoron, and Hydatid of Morgagni.*

45.113. Cyst of the Parovarium.

Hunterian. CC. 45e.

The right Fallopian tube, ovary, broad ligament, and part of the uterus suspended by the tube and edge of uterus, the broad ligament hanging down, showing a simple cyst about the size of an orange. The cyst occupies the outer edge of the broad

ligament, clearly lying between its folds, and projecting much more to the front than to the back. The ovary, as the specimen hangs, is above the centre of the cyst; *i.e.* in the natural position the cyst would be external to it, and lying between it and the fimbriated extremity, which is displaced to about 5 cm. from the ovary by the cyst, instead of lying in close apposition to it. The outer third of the Fallopian tube is stretched over the cyst, and the fimbriated extremity lies upon its posterior surface towards the outer side. The inner part of the broad ligament forms a well defined pedicle to the cyst. From its relations to the Fallopian tube and ovary the cyst is clearly parovarian. It is figured in Matthew Baillie's *Engravings*, Fasc. IX., Pl. VII., fig. 1, where it is also described as "dropsy or dropsical tumour of the Fallopian tube," the position of the fimbriated orifice probably suggesting that it was of this nature. Compare next specimen. For contrast between the parovarian and the ovarian cyst, see also No. 45.92.

45.114. Papillomatous Cyst of the Broad Ligament and Simple Cystic Ovary with Corpus Luteum.

Presented by Dr. J. K. Kelly, 1897.

The Fallopian tubes and ovaries from a case of which Dr. Kelly has supplied the following history: "Mrs. M'C., aet. 29; 3 para. Well till abortion in July, 1897; since then always troubled with pains and weakness in left side and left arm and leg. This suddenly increased after last menstruation two months ago, since which she has been confined to bed. With the pain is a bearing-down feeling and a tendency to tenesmus. On admission, 19th Oct., 1897, the fundus uteri reached to $1\frac{1}{2}$ in. below the umbilicus. The uterus was movable, enlarged to greater than size of two months' pregnancy. In left fornix vaginae, and passing behind cervix into the pouch of Douglas, an indistinct, irregular tumour, partly cystic, partly doughy in character, exceedingly tender to palpation was found. The right ovary was enlarged; there was no lividity of mucous membranes, but the mammae were secreting. Diagnosis—tubal pregnancy on left side probable. 29th Oct.—abdominal section. 1st Nov.—abortion, ovum about fourth week. 12th Nov.—patient dismissed well."

The uterine appendages on both sides were removed. The right ovary is considerably enlarged, the enlargement being chiefly

due to two cysts, the one 2·5 cm., the other 6 cm. in diameter; the whole mass being fully as large as a duck's egg. The smaller of the cysts is a large corpus luteum of pregnancy, the larger, a simple ovarian cyst like those in Nos. 45.88 *et seq.* The left appendages show a normal healthy ovary attached by a breadth of broad ligament to a thin walled cyst of long oval shape, about 8 by 4 cm., over the top of which is stretched the Fallopian tube. The fimbriated extremity is recognized flattened out on the opposite end of the cyst from the ovary. The tube is quite pervious, and it is shown to be quite clear of the tumour by being dissected from it at one point, and a bristle passed under it. The cyst lies between the layers of the broad ligament, between the ovary and the outer end of the Fallopian tube. Near its outer end there is a constriction, which is seen to be due to a mass of warts (papillomata) growing in a ring round it inside. They seem to divide the cyst into three loculi, but there is a free passage between them through the middle of the warts. It is a simple papillomatous cyst of the broad ligament, derived from some part of the parovarium.

45.115. Large Hydatid of Morgagni.

Presented by Dr. J. K. Kelly, 1897.

The ovaries, with the outer segments of the Fallopian tubes, removed from a case of inoperable cancer of the uterus. Mrs. M'G., aet. 38. Double oophorectomy and salpingectomy was performed. Delirium tremens, which she had had before the operation, came on three days after, and she died a week after the operation. From the fimbriated extremity of the left tube hangs a large clear thin-walled cyst of oval shape, measuring 2·5 by 2 cm., which is an unusually large hydatid of Morgagni. The ovaries show healthy Graafian follicles, and the remains of a corpus luteum; evidently they were functionally active.

(f) *Tumours of the Mamma.*

45.116. Carcinoma of the Mamma. *Hunterian. DD. 15a.*

A slice off the front of a breast showing the nipple replaced by a large circular excrescence 7 cm. in diameter, consisting of

fungating tumour. On the deep surface the tumour is seen in section. Microscopically it is found to be a highly cellular carcinoma. (MS. Notes, J.H.T., p. 102.)

45.117. Carcinoma of the Mamma.

Presented by Dr. J. W. Wallace, 1898.

Section of a mamma through the nipple. The tumour appears as a whitish mass amid the yellow fat of the mamma. It occupies the whole of what has been the gland proper, and seems to have contracted the organ considerably; compare normal mammae Nos. 44.45 and 44.46. It extends vertically from the nipple (which is somewhat retracted) 3 cm., and in breadth 6 cm. Outrunners from it have invaded the underlying pectoral muscle, and the axillary glands were infected. It is a carcinoma of the scirrhous type, like the succeeding specimen. (West of Scotland Clin. Res. Lab., No. 2/61.)

45.118. Carcinoma of the Mamma.

Presented by Dr. J. W. Wallace, 1898.

Section of a rather smaller mamma through the nipple. The tumour extends from below the nipple principally towards one side—towards the axilla. A deep cicatrix dips down into the tumour near its edge; at the bottom of this cicatrix, and around the nipple, the surface of the growth is ulcerated. The nipple is considerably retracted by shrinking of the older parts of the growth. In microscopic structure it is a carcinoma of the scirrhous type, consisting at the growing edge of small solid processes of epithelial cells infiltrating the neighbouring muscle, fat, or skin; in the older parts these processes have largely disappeared, and only a dense fibrous tissue like that of an old cicatrix remains. (West of Scotland Clin. Res. Lab., No. 1/337.)

SERIES 46.

"INCUBATED EGG."

The series formerly consisted of about 70 specimens, which have all deteriorated more or less. The 18 specimens which remain fit for exhibition form a very imperfect series, but they serve to illustrate a number of points in the development of the chick, and foetal appendages. The early stages of development must be studied in the series of embryological wax models, No. 51. It is hoped in the future to fill the gaps in the series with new specimens.

46. 1. The Ovary and Oviducts of a Breeding Hen. *Hunterian.*

The back part of a hen, skinned, and with all the anterior parietes and digestive organs removed, showing the ovary, which consists of a cluster of eggs in various stages of ripeness enclosed in their capsules. Four of them are far advanced; the largest about the size of the mature yolk of an egg. The long twisted oviduct and the cloaca are partly laid open; the orifice of the latter is kept open by a bougie.

46. 2. The Ovary and Oviducts of a Breeding Bird (Hen ?). *Hunterian.*

Similar to the preceding, injected red. The oviduct being unopened is more distinct.

46. 3. The Blastoderm "at 36 Hours." *Hunterian. NN. 14.*

The blastoderm of an egg, described as at 36 hours, mounted with pins on blue paper. Seen from below. It shows the area

opaca, enclosing the area pellucida, across which the embryo appears as a white streak. With a lens, the head fold, the two medullary ridges with the medullary groove between them, the protovertebral segments, and, at the tail end between the diverging medullary folds, the primitive streak and fold, can be made out. The specimen is torn in one or two places.

46.4. The Blastoderm "at 48 Hours." *Hunterian. NN. 17.*

A similar preparation, said to be at 48 hours; seen from below. The area of the blastoderm is considerably larger. With the naked eye the head end can be recognized, raised from the plane of the blastoderm, mostly composed of the cerebral vesicle. The omphalo-mesaraic (omphalo-mesenteric) veins, protovertebrae, tail fold, and remains of the primitive streak can be seen with a weak magnifying glass. The heart lies just ahead of the omphalo-mesaraic veins, but is indistinct. A very slight trace of the amniotic fold can be seen at the sides of the head. Imperfect.

46.5. The Blastoderm at rather over 48 Hours.

Hunterian. NN. 19.

A similar specimen, described as "at 48 hours," but considerably larger and more advanced than the preceding. It is imperfect; the somato-pleuric and splanchno-pleuric folds being torn just below the head. It shows the omphalo-mesaraic circulation spreading out over the yolk, forming the area vasculosa, which is now fully 1 cm. broad. The trunks of the omphalo-mesaraic vessels, and their tree-like branchings, and the sinus terminalis in a circle around the edge of the vascular area are very distinct. Shows also the flexure of the head, and the formation of the tail fold.

46.6. The Blastoderm at 98 Hours. *Hunterian. NN. 31.*

A similar preparation seen from above; the area vasculosa 3 cm. wide; the embryo completely folded off, and enclosed in the amnion, which fits closely around it. It is badly twisted—head turned to its right, tail to left. The head shows the strongly marked cranial flexure, which causes the mid-brain at this stage to form the foremost part of the embryo. Shows also the fore-brain,

eye, and the four visceral clefts, and five visceral folds. Also the pit of the ear dorsal to the first visceral fold, and the heart in front of the neck. An imperfect specimen.

46.7. The Blastoderm, Embryo, Area Vasculosa and Allantois. "Fifth Day." *Hunterian. NN. 35.*

The embryo and area vasculosa spread out on blue paper, viewed from above; badly torn. The area vasculosa is about 6 cm. broad. The embryo lies on its left side, enveloped in the amnion; it is strongly curved. From the abdomen at the tail end rises a round bag about 1 cm. in diameter, which is the allantois. "At a hundred and twenty hours, or fifth day complete."

46.8. Embryo Chick "on the Sixth Day."

Hunterian. NN. 37.

A similar preparation, showing the embryo lying in the centre of the large area vasculosa. The amnion is torn, showing the embryo well formed, the head very large, the fronto-nasal process beginning to project like a beak, and the limbs distinct. The avian characters are not yet distinct. The allantois is not well shown. Very imperfect.

46.9. The Contents of the Egg at the "Eighth Day" of Incubation. *Hunterian. NN. 42.*

The whole contents of the egg, the shell and shell membranes and outer layer of amnion removed, "hanging by one of the chalazae." The blastoderm, in the form of area vasculosa, has extended over more than one-half of the yolk. Its vessels are less distinct than in earlier specimens. The white has been absorbed into the yolk, which is now larger than it was at first, forming fully half of the specimen. At the lower end is the transparent allantois, now a large sac with numerous blood-vessels, which was spread out between the amnion and the membranous lining of the shell. Lastly, the chick about 2 cm. long can be seen at the lower end of the specimen, enclosed in the amnion, which now envelops it loosely. Compare next specimen.

46.10. Embryo Chick at the "Eighth Day".*Hunterian. NN. 43.*

The chick in its amnion. The head is not so large in proportion to the body as formerly; the beak is well formed—generally, the avian characters quite distinct.

46.11. The Contents of the Egg at the "Eleventh Day" of Incubation.*Hunterian. NN. 50.*

The allantois, which "had quite enclosed chick, yolk, and white," is pulled to one side to show the chick in its amnion, with the rudiments of the feathers appearing on its back; the yolk sac is not quite so large as in No. 9, and shows a considerable depression (the air chamber) on one end of it. Imperfect.

46.12. Embryo Chick. Eleventh Day. *Hunterian. NN. 51.*

The chick freed from its membranes and the thorax and abdomen opened showing the viscera, which are now quite recognizable.

46.13. The Contents of the Egg. Thirteenth Day.*Hunterian. NN. 54.*

Similar to No. 11. The yolk is smaller, and the chick and allantois much larger. To the lower end of the allantois (the organ of respiration) is attached the portion of egg-shell, with its shell membrane, which constitutes the air-chamber.

46.14. The Contents of the Egg. Fifteenth Day.*Hunterian. NN. 58.*

The shell and shell membranes removed; not dissected. The whole yolk and chick are now surrounded by the allantois.

46.15. Chick on the Seventeenth Day, with the Allantois and Yolk.*Hunterian. NN. 62.*

Suspended by the yolk on one side, by the reflected allantois on the other, the chick hanging below. It is now well formed and covered with feathers. The yolk is much reduced in size.

46.16. Chick on the Eighteenth Day, with the Allantois and Yolk. *Hunterian. NN. 63.*

Similar preparation, the allantois with the chorion and shell membrane attached hanging below, its vessels beginning to atrophy; it retains the shape of the egg. The yolk sac is beginning to be drawn into the abdomen.

46.17. The Contents of the Egg about the Eighteenth Day. *Hunterian.*

A chick in a similar stage of development, the enveloping membrane intact. The yolk sac lies between the legs, pressed upon the abdomen.

46.18. Chick on the Nineteenth Day. *Hunterian. NN. 64.*

"Yolk more than half taken into the abdomen, vessels on the inside of the shell much shrunk," *i.e.* allantois much atrophied. The yolk sac is much reduced in size.

46.19. Chick newly Hatched; its Abdomen Opened.

Hunterian. NN. 66.

"Opened to show urachus" (stalk of the allantois) "entering the under side of rectum" (cloaca) "and admitting a crow-quill." Compare with the manner in which the urachus is attached to the top of the bladder in mammals.

SERIES 47.

"GENERATION. RABBITS."

47.1. Genital Organs of a Doe Rabbit in Heat.

Hunterian. OO. 1.

"The uterus of a rabbit, hot, that had not received the male; the vagina is about 6 inches long, and half an inch in breadth; there are three openings into it, one from the bladder, about 2 inches from the vulva, and two at the opposite end from each horn of the uterus; the horns are much curved, about 4 inches in length, and $\frac{1}{8}$ in diameter; in the end next vagina they become smaller and smaller as they approach the ovaria and Fallopian tubes, which run serpentine, and are nothing else than a continuation of the horns; the ovarium is of the size of a kidney bean, and within one-fourth of an inch of the orifice of the tube, which is rugous and fimbriated, resembling a full blown pink in its shape nearly. When the animal is hot, the vagina is internally almost black from the derivation of blood to it, and the ovaria are externally covered with a number of pellucid little grains, like drops of glass, which contain the ova in their centre, and afterwards become corpora lutea: injected red."

47.2. Portion of Uterus and Appendages of a Rabbit in Heat.

Hunterian. OO. 2.

"A portion of the uterus, Fallopian tube, and ovarium of a rabbit, hot, but which had not received the male: some of the formerly mentioned grains in the ovarium appear here very bloody, so that they form now dark spots; there are several of the others; but from the size of the dark ones, it seems probable they were to give out the first ova, and they are accordingly more vascular

and forward than the other ones; they project but little above the surface of the ovarium: not injected." Now decolorized by the spirit.

47.3. Genital Organs of a Doe Rabbit "Two Hours after the Coitus." *Hunterian. OO. 3.*

"The uterus of a rabbit two hours after the coitus: the round bodies in the ovarium more pouting, more vascular than the last; the internal surface of the uterus redder, *i.e.* the derivation of blood to it greater, but little else different from No. 1. Injected."

47.4. Part of Uterus and Appendages of Rabbit "the First Day of the Coitus." *Hunterian. OO. 4.*

"A portion of uterus, Fallopian tube, and ovarium of the rabbit, the first day of the coitus; the appearance of the round bodies in the ovarium as in the last, only not injected." The bristles stuck into the ovary in this and the succeeding specimens indicate the number of days after coitus.

47.5. Part of Uterus and Appendages of Rabbit "the Second Day of the Coitus." *Hunterian. OO. 5.*

"A portion of the uterus, Fallopian tube, and ovarium, the second day of the coitus; no apparent change on the uterus from the former, but in the ovarium the corpuscles are more projecting above the surface of ovarium, and form a nipple-like appearance."

47.6. Fallopian Tube and Ovary of Rabbit on the "Third Day" after Coitus. *Hunterian. OO. 6.*

"Ditto on the third day: no apparent difference from the former; the corpuscles in the ovarium flatter than could have been supposed." The flattening is due to umbilication of the vesicles, which are now distinctly corpora lutea.

47.7. Ovary of Rabbit on the "Fourth Day" after Coitus. *Hunterian. OO. 8.*

"A portion of the uterus, Fallopian tube, and ovarium in the rabbit, on the fourth day: appearances very little different from

those of the third day ; corpora lutea a little more prominent ; in some the appearance of a superadded, round, very small body, on the most prominent point, in others this looks more like a small cavity or depression."

47.8. Uterus, Tube, and Ovary of Rabbit on the "Fifth Day" after Coitus. *Hunterian. OO. 10.*

"A portion of the uterus, Fallopian tube, and ovarium slit open, on the fifth day : at different parts, the uterus could be perceived enlarged and rounded, where internally the ova were contained ; the corpora lutea appear to sink deep into the substance of ovarium, as well as to project much above its surface, and are considerably (larger) than in No. 8."

47.9. Uterus and Ovary of Rabbit. "Sixth Day." *Hunterian. OO. 12.*

"A portion of the uterus, Fallopian tube, and ovarium, on the sixth day : appearances of the fifth day a little more increased."

47.10. Uterus and Ovary of Rabbit. "Sixth Day." *Hunterian. OO. 13.*

"Ovarium of the sixth day : as in the former ones the day is denoted by the number of bristles inserted here ; as in the last, the corpora lutea project much beyond the surface of ovarium, which is now externally rough and tuberculated."

47.11. Uterus and Ovary of Rabbit. "Sixth Day." *Hunterian. OO. 16.*

"A portion of the uterus of the rabbit, on the sixth day, with ovarium and Fallopian tube : the cells in which the last-mentioned ova (in tube No. 14, now wanting) were contained, are seen opened in two instances."

47.12. Uterus and Ovary of Rabbit. "Sixth Day." *Hunterian. OO. 17.*

"Ditto : two cells opened ; ova removed to show the surface of uterus to which they adhered loosely ; on the posterior side is seen

a bit of decidua, nearly as in the human subject, attached to the mica, to which the above-named preparation is fixed before. No appearance of foetus as yet."

47.13. Uterus of Rabbit on the "Eighth Day" after Coitus. *Hunterian. OO. 20.*

"Portion of the uterus of the rabbit, opened; attached to blue paper; on the eighth day: it showed the foetus, which was made visible by dropping distilled vinegar on it, but is now not visible from the opposite white ground."

47.14. Part of Uterus with Ovum of Rabbit. "Ninth Day." *Hunterian. OO. 22.*

"One of the cells of the uterus, in which is enclosed ovum of the ninth day, opened: the foetus amazingly increased—to four or five times (perhaps ten times) its first visible size; the cavity of the ovum very large, and full of ropy transparent fluid." The embryo hangs down by a portion of membrane. It is about 2 mm. long, strongly curved forwards, and the head is distinguishable, and the tiny buds for the limbs.

47.15. Ovary and Part of Uterus with Ovum of Rabbit. "Ninth Day." *Hunterian. OO. 23.*

"Ditto, with Fallopian tube, and a section of ovarium; the corpora lutea, in a side or vertical section, evidently hollow in the centre." The embryo slightly larger than in the preceding.

47.16. Ovary and Part of Uterus of Rabbit. "Eleventh Day." *Hunterian. OO. 25.*

"A portion of the uterus, Fallopian tube, and ovarium of the rabbit, on the eleventh day: the foetus seen lying in its cell, and still enclosed in its amnion, proportionably larger than in No. 24 (wanting), but even now the navel-string is hardly visible; the corpora lutea, very large, and project much above the surface of the ovarium, which is now very rough." The embryo lies on its right side, on what afterwards becomes the placenta. Compare No. 269 in Series 48.

47.17. Part of Uterus of Rabbit. "Fourteenth Day."*Hunterian. OO. 30.*

"A portion of fourteenth day uterus with ovarium, injected: the corpora lutea are as red as vermilion; seen in a vertical section of ovarium, and apparently hollow in the centre." A cell of the uterus is laid open, and the embryo removed, showing the placenta, partially injected red, and the remains of the amnion. Considerably larger than the preceding.

47.18. "Polypus" of Uterus of Rabbit. *Hunterian. OO. 31.*

"A portion of uterus, ovarium, and Fallopian tube of the rabbit, on the sixth day after the coitus; in the extremity of the horn next the Fallopian tube, is a polypous excrescence, which, though it did not prevent conception in the ovarium of that side, prevented four ova from getting further into the horn than merely the entrance, and would probably have induced abortion." The ova have been removed.

47.19. Ovarium of Rabbit. Corpora Lutea. Eleventh Day.*Hunterian. OO. 33.*

"An ovarium of the eleventh day: the increased size of the corpora lutea very remarkable, so that it resembles a mulberry nearly in external roughness." Dried.

47.20. Ovarium showing Corpora Lutea. Rabbit.*Hunterian. OO. —.*

(Not described.) Apparently from a rabbit. Split open. Larger than the preceding.

47.21. Ovarium showing Corpora Lutea. Rabbit.*Hunterian. OO. —.*

(Not described.) Similar to the preceding, but not split. "11th day" cut on the foot of the jar.

SERIES 48.

“GRAVID UTERUS.”

ANATOMY OF THE HUMAN GRAVID UTERUS AND ITS CONTENTS, AND COMPARATIVE ANATOMY OF THE PLACENTA.

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In William Hunter's MS. Catalogue, and in the printed catalogue prepared from it, the series "*R.R. Gravid Uterus*" comprised preparations illustrating not only the anatomy of the human gravid uterus and its contents, but also pathological conditions related to pregnancy and parturition. In the new catalogue the pathological preparations have been separated, and constitute Series 49. The old title has been retained for the series containing the anatomical preparations and the plaster of Paris casts illustrating gestation, which were included in the series originally, but were separated from it in the printed catalogue of 1841.

The series is the largest and most valuable in the collection, and it is also the most interesting historically, on account of its relations to William Hunter's greatest works, viz., the volume of plates entitled *The Anatomy of the Human Gravid Uterus exhibited in Figures*, and the less important *Anatomical Description of the Human Gravid Uterus and its Contents*.

These works have been freely quoted in the descriptions of the specimens, and the references to all passages quoted and to figures which have been identified with preparations (twenty-one in number) have been inserted. A few quotations have also been made from the MS. *Midwifery Lectures*. A brief account of these works and of the MS. will be found in the list of works referred to at the end of the catalogue and in the introduction.

Of all the series in the collection this was the one most systematically arranged, following to a certain extent the order in which the subject is treated in the second of the above-mentioned works, but more closely that of the *Midwifery Lectures*. This order has been as far as possible retained; e.g., in Section II. there is a set

of preparations illustrating the anatomy of the contents of the uterus in general, and then a larger set illustrating the different parts of it more particularly, just as William Hunter treated the subject in his lectures; see Nos. 48.83, *et seq.*

SECTION I.

THE ANATOMY OF THE HUMAN GRAVID UTERUS AND ITS APPENDAGES, MOSTLY IN THE NINTH MONTH.

(a) Size, Figure, and Situation of the Gravid Uterus, illustrated by Casts in Plaster of Paris.

"We are now going to treat of the impregnated or pregnant uterus. We have already seen the uterus in its unimpregnated state. I shall show you some real preparations of the gravid uterus, and also some others in plaster of Paris, and in the last all the sizes of the parts with their shape and situation are exactly as in nature herself. They were made in this manner: the body was first opened and put into a proper situation; then the plaster of Paris was thrown over it, which made a mould for these to be cast into, so that the whole of them are exactly nature herself, and almost as good as the fresh subject. We have a good many of them to help us on; they are most useful, especially where it is so difficult to get a subject of this kind to explain upon in a course of lectures." (*Midwifery Lectures*, MS. R.C.S.Eng., 42, c. 31, p. 1.)

48.1. The Uterus at the End of the Ninth Month of Pregnancy. From before.

Hunterian Cast No. 1. RR. 1.

"A cast in Paris plaster, coloured after life," taken from the subject from which were drawn the first ten plates of Hunter's *Gravid Uterus*. It represents the first plate; but having been taken after the upper part of the trunk had been removed, it exhibits the body as in the second plate, but the uterus as in the first. The subject was "a woman who died suddenly in the end of her ninth month of pregnancy in the year 1750. The arteries and veins were injected with wax of different colours." (Desc. of Pl. I.) The cast takes in "the lower half of the trunk of the body, and upper half of the thighs; shows the abdomen opened and the gravid uterus at

the ninth month, occupying the pelvis and the largest anterior part of the abdomen; the intestines are behind, above, and chiefly to the left of the uterus; it is not of a regular pyriform appearance, but there are eminences and cavities on its surface, owing to the shape of the child's body underneath; the bladder is seen compressed into a flattish form between uterus and pubis, and the external parts of generation are *in situ*; the arteries and veins on the uterus large." "Its situation is a little oblique and towards the right side." The swelling to the right side of the fundus is caused by the buttocks of the child; that to the left by the placenta. At either side are seen the Fallopian tube and round ligament. On the left the spermatic vessels occupy the space between the tube behind and the round ligament in front. The artery is very small compared to the vein, and runs a winding course over it. The pudenda were oedematous.

48.2. The Uterus at the End of the Ninth Month of Pregnancy. From the Right Side.

Hunterian Cast No. 2. RR. 2.

A cast in plaster of Paris identical with the preceding, but placed so as to give the view depicted in Pl. II. of Hunter's *Gravid Uterus*, viz., that from the right side. The trunk has been cut away down to the level of the diaphragm, which is preserved along with part of the lower ribs and ensiform cartilage, so as to keep all the abdominal viscera in their natural position. The ends of the aorta and oesophagus (tied together) and vena cava project from the diaphragm. The edge of the liver projects below the diaphragm with the falciform ligament visible in the longitudinal fissure. Below it appear the cut edge of the omentum and one or two turns of intestine. The uterus is as in the preceding. In the side view, the relations to it of the Fallopian tube and round and broad ligaments appear more clearly.

48.3. The Uterus at the End of the Ninth Month of Pregnancy. From the Left Side.

Hunterian Cast No. 3.

Identical with the preceding, but viewed as in Pl. III. of Hunter's *Gravid Uterus*. On the extreme left, below the edge of the liver, is seen a small area of the great extremity of the stomach, below and overlapping which appears the anterior edge of the spleen,

distinguishable by its notch. A large space between these and the uterus is occupied by the greater part of the intestines. A broad mass of omentum lies between them and the transversalis muscle. As in the preceding, the appendages are seen pressed close to the side of the uterus. The round ligament is longer than on the other side, from the obliquity of the uterus towards the right.

48.4. The Uterus at the End of the Ninth Month of Pregnancy. From before. The Anterior Wall of the Pelvis removed.

Hunterian Cast No. 4.

Plaster of Paris cast, coloured, corresponding to Pl. IV. of Hunter's *Gravid Uterus*. The pubic bones have been removed along with the soft parts over them and the anterior parts of the labia majora and minora and the point of the clitoris. The cut ends of the rami of the pubes and ischia have been slightly drawn apart to give a clearer view of the contents of the pelvis. In front of the lower parts of the womb are seen the cut edge of peritoneum, which ascends from the bladder to line the anterior parietes of the abdomen; also the bladder, which was compressed between the child's head and the symphysis pubis. Below this, in the centre, is the cut end of the clitoris, with its crura and erectores clitoridis stretching out to the descending ramus of the pubis on either side, and elongated and rendered more horizontal by the separation of the bones. Below this is the oval orifice of the vagina, with its anterior wall, where it is attached to the neck of the bladder and urethra, pressed down by the viscera that lie over it. At the upper point of this oval orifice "the tuberos extremity of the urethra is seen with the orifice of the meatus urinarius." (Desc. of Pl. IV.)

48.5. "The Child in the Womb in its Natural Situation."

Hunterian Cast No. 6. R.R. 70.

Cast in plaster of Paris, coloured, corresponding to Pl. VI. of Hunter's *Gravid Uterus*. From the same subject as the preceding. but "all the upper part of the bladder is cut away in order to show the situation of the child's head in the lower part of the womb. All the forepart, both of the womb and of the secundines (which included the placenta), is removed. The navel-string is cut, tied, and turned to the left side over the edge of the womb. At the fundus the investing membranes are likewise turned over the

edge of the womb, that they might be more apparent. The head of the child is lodged in the lower part of the womb or in the cavity of the pelvis; and its body lies principally in the right side. Its position is diagonal or oblique; so that its posterior parts are turned forwards and to the right side of the mother, and its foreparts are directed backwards and to the left side. Its right foot appears between its left thigh and leg. Its body was covered with a white greasy mucus which is commonly seen on children at their birth. This is represented at the upper part of its back, where it was intersected with lines from the wrinkles and motion of the child's body. Every part is represented just as it was found, not so much as one joint of a finger having been moved to show any part more distinctly or to give a more picturesque effect." (Desc. of Pl. VI.) The long axis of the head is in the left oblique diameter of the pelvis, the occiput pointing to the right foramen ovale, "the left ear forwards and an inch or two to the left of the symphysis pubis"—the second cranial position.

48.6. "The Child in the Womb in its Natural Situation."

Hunterian Cast.

A replica of the preceding, not mentioned in the catalogue.

48.7. The Attitude of the Child in the Womb.

Hunterian Cast No. 8.

A cast of the trunk and upper parts of the thighs of a woman about the end of pregnancy, the abdomen opened by a crucial incision, the flaps turned aside, and the anterior parietes of the uterus removed as in the preceding, to show the foetus in its natural position. In this case the foetus lies with its head well down in the pelvis, in the right oblique diameter—occipito-posterior—the forehead pointing to the left foramen ovale, "the left ear to the right of the symphysis pubis."—third cranial position. The posterior parts of the child are turned backwards, its body occupying the right side of the womb, and the limbs towards the left. The placenta had been removed along with the parietes. The transverse colon passes over the top of the fundus uteri. The vulva has been oedematous. There is no history of the case from which the specimen was obtained.

**48.8. The Attitude of the Foetus. Breech Presentation.
First Position. Cord round Neck.**

Hunterian Cast No. 9. RR. 73.

“A cast in Paris plaster, nearly the whole trunk of the body and upper part of the thighs included, from a woman at the ninth month; uterus opened, shows the child presenting by the breech; the child does not lie oblique, but almost perpendicular, and parallel to the sides of the body; one turn of the navel-string round its neck.” The position is the first breech, the long axis of the head of the child corresponding with the right oblique diameter of the pelvis; the breech with the left oblique. The back of the child is anterior and towards the left side of the mother.

**48.9. The Shape, Size, and Position of the Uterus with
the Foetus presenting by the Breech. Second
Position.**

Hunterian Cast No. 12.

A cast in plaster of Paris, coloured, of the whole trunk of a woman at full time, the abdomen opened by a crucial incision and the flaps turned aside; the uterus intact. It is moulded to the foetus in such a way that the position can easily be made out. The head is right at the fundus. Immediately below, and separated from it by only a slight depression, is the prominence of the right shoulder. From this the broad expanse of the back runs away towards the right side of the mother and downwards, and the ridge of the upper arm runs to the left, and, where the elbow meets the right knee, a second prominence (due to the knee) is felt. The thigh, arm, and body enclose a well-marked depression just to the left of the middle line, below which the back makes a smooth surface down to the brim of the pelvis. Projecting between the left side of the uterus and the abdominal wall are several loops of intestine; none of the other viscera are visible. (There is no description in the old catalogue.)

**48.10. Breech Presentation. Second Position. Insertion
of the Placenta over the Lower Segment of the
Uterus.**

Hunterian Cast No. 10.

The same as the preceding, but with the uterus opened by a crucial incision and the muscular flaps turned aside. The foetus is enclosed in the amnion. At the lower part the edge of the placenta is seen opposite the lower part of the back and breech. It is attached to the uterus very low down—a decidedly perilous position.

There is no history, so whether or not the case was one of placenta praevia is not known. (No description in old catalogue.)

48. 11. Breech Presentation. Second Position. Attitude of the Foetus.

Hunterian Cast No. 11.

Cast from the same subject as the preceding, with the amnion removed and the edge of the placenta turned down, showing the large radiating vessels of its inner surface. Compare No. 48. 9 for the relations of the projections of the surface of the uterus to the parts of the foetus. The surface of the head and shoulders of the foetus is remarkably even, the hands being raised to the head and filling up the corners between them. The breech points very straight back towards the right sacro-iliac synchondrosis, occupying the right oblique diameter of the pelvis. It does not appear to have engaged in the brim of the pelvis. The child is a fairly large one. (No description in old catalogue.)

48. 12. Pressure of the Gravid Uterus on the Rectum and Urethra, producing Distension of the Intestines and Bladder.

Hunterian Cast No. 19.

(No description.) A cast in plaster of Paris, coloured, of the whole trunk and part of the thighs of a woman, apparently near full time. The abdomen is laid open by a crucial incision. The hypogastric region is occupied by the bladder distended to about the size of the uterus at six months. Above this, directed towards the left, is the uterus, of fair size for full time. The right side of the abdomen and epigastric region are occupied by enormously distended great intestine. The distension of the abdomen must have been very great, and it appears probable that the obstruction of the bowels and bladder by the uterus and its contents was the cause of the death of the woman. The body was well nourished. (No history.)

48. 13. The Uterus about the Sixth Month of Pregnancy.

Hunterian Cast No. 20.

(Not described.) Cast in plaster of Paris, coloured, of the whole trunk and part of the thighs, the abdomen opened by a crucial incision, the flaps turned aside, and the anterior parietes of the uterus removed. The uterus is much smaller than at full time, but it extends well up in the abdomen, occupying the whole of the hypo-

gastric and umbilical regions. The intestines project all round the sides and apex of the uterus, and the bladder between it and the symphysis pubis. The uterine wall is about the same thickness as in the full time specimens. The foetus lies with its back directed to the left, the head downwards, turned over the right shoulder, and occupying the left oblique diameter of the pelvis—occipito-posterior—fourth cranial position. The foetus fills up the cavity of the uterus so completely that it could hardly have been able to reverse its position and present the breech, though it could move sufficiently freely in other ways.

48. 14. Gravid Uterus and other Contents of the Abdomen about the Fourth Month of Pregnancy.

Hunterian Cast No. 21.

(Not described.) A plaster of Paris cast, coloured, of the trunk of a woman, the whole anterior parietes of the thorax and abdomen removed to show the positions and relations of all the viscera in those cavities. The mons veneris has also been split and turned aside exposing the pubic bones. The specimen gives a very good view of the viscera as they appear when a subject is opened in the post-mortem room. The liver is slightly enlarged, and the hollow viscera are considerably distended. Between the lower coils of small intestine and the pubis is a space not more than two fingers' breadths wide, through which appears a rounded viscus very like the uterus at the end of the fourth month. It appears to be the uterus, as, though there is no appearance of the bladder between it and the pubis, it seems to be rising further back among the intestines than would that viscus, and is no nearer to the pubis than it might be with the bladder empty. It has risen but little above the pubis, does not project forwards at all, and would not have produced any swelling of the abdomen. Its position suggests that the distension of the intestines might well be due to pressure by it on the rectum.

(b) *The Muscular Wall of the Uterus.*

(*Jar Specimens.*)

48. 15. Transverse Section of the Uterus Some Days after Delivery.

Hunterian. RR. 8.

"A section transversely through the substance of the uterus,

some days after delivery, when it had contracted to a fifth of its former size; the sides are now about two inches thick, and the cavity about an inch broad, and seven-eighths from before to behind; this section was a little above the cervix." When measured out of the jar (which magnifies considerably), the walls are found to be $1\frac{1}{4}$ inches thick (3 cm.) and the cavity measures one inch (2.5 cm.) by three-eighths of an inch (almost 1 cm.). The wall is seen to be composed of interlacing bundles of muscle with a fair number of blood-vessels. On one side of the cavity the muscle bundles are covered with a distinct layer of decidua. Compare the thickness here with that of the uncontracted uteri in the casts and some of the wet specimens, *e.g.* Nos. 48.32, 48.156, and 48.158.

"Those who say that the uterus grows thicker in the same proportion that its bulk is increased have probably been deceived by examining the uterus of a woman who died some hours after delivery. In that contracted state the uterus is often found even two inches thick; but in all those which I have examined in the natural distended state, though there was some difference, the thickness of the uterus was but a little more considerable than before impregnation. When not injected, its common thickness is from one to two-thirds of an inch; when its vessels, and particularly its veins, are pretty well filled with wax, its thickness is thereby considerably increased, more especially where the placenta is fixed, on account of the number and size of the vessels at that part. For this reason only, perhaps, the uterus is thickest at that part, and for this reason, too, it is commonly thicker towards the fundus than near the cervix. In respect of thickness I have observed a good deal of variety, and such inequalities in the same uterus, that even where the placenta did not adhere, the uterus has been almost twice as thick at one part as at another. I have always observed, on opening the uterus, that its thickness is more considerable than one could have imagined it to be by feeling it externally, where there is a fluctuation of the water. Its substance is so soft that the fluctuation then felt is like that of water in a thin bag." (*Description of the Gravid Uterus*, p. 13.)

48.16. The Wall of the Gravid Uterus after Delivery.

Hunterian. RR. 6 (?).

(Numbered *RR. 6* on jar, but does not correspond.) It appears

to be a section of the same uterus as the preceding, higher up and including the appendages. The dimensions are very similar, but the cavity is flatter from back to front. The areolar tissue between the two sides of the broad ligaments is spread out with bristles.

48.17. Longitudinal Section of the Wall of the Gravid Uterus after Delivery. *Hunterian. RR. 9.*

A longitudinal slice, about 6 mm. thick, out of the wall of a recently emptied gravid uterus, thickened by having contracted, and probably also by the vessels having been injected. See under No. 48.15. The section has traversed the site of the placenta. Internally it is ragged from the remains of that structure, and the inner two-thirds of the total thickness are honeycombed with the blood-vessels which ran to and from it. The outer third and the peritoneal layer have far fewer vessels. The total thickness is fully two inches (5 cm.); the round of the jar makes it appear much greater.

48.18. Muscular Fibres of the Uterus. *Hunterian. RR. 10.*

“Uterus much contracted after delivery, boiled and unravelled to show its muscular fibres.”

48.19. Muscular Fibres of the Uterus. *Hunterian. RR. 177.*

“A small portion of the uterus, injected red, showing distinctly muscular fibres.”

48.20. Arrangement of the Internal Muscular Fibres around the Orifices of the Fallopian Tubes.

Hunterian. RR. 11.

“Two portions of the uterus at birth, in the centre of which are seen the orifices of the Fallopian tubes coming into the cavity of uterus, and round these orifices for four or five inches are seen the muscular fibres in packets forming vortices or concentric circles.” (Old catalogue.) “I have taken considerable pains to trace the arrangement of the uterine fasciculi, but, except upon

its inner surface, I have observed nothing but irregularity and confusion. On the inner surface itself I have observed some variety, and always, where the placenta adheres, a good deal of irregularity.

“In a woman who died seven days after delivery, I gave up the uterus to this pursuit, and examined the fibres very carefully. I stretched it gradually in warm water, then inverted it, to have a full view of its inner surface. The remains of the decidua had been melted down, and passed off with the lochia, so that the fasciculated stratum of muscular fibres appeared to be bare, and to make the internal surface of the uterus. In a great number of places, but particularly where the placenta had been fixed, the fasciculi left oval spaces between them for the passage of arteries and veins, somewhat like those separations in the tendinous fibres of the abdomen and loins, where the vessels pass out to the cellular membrane and integuments. The cervix uteri, where the penniform rugae are situated, had not such regular nor so large fasciculi as the rest of the uterus. In the body of the uterus the fibres were very regularly circular—the fundus was made up of two concentrically circular planes of fibres, at the very centre of which was the orifice of the Fallopian tube. The better to conceive this arrangement of the internal muscular fibres, we may suppose each corner of the fundus uteri, where the tube is inserted to be stretched or drawn out, so as to make two horns or a bifid fundus as in the quadruped; then, if we understand the inner fibres to be circular in every part of the uterus, we understand clearly how they will be circular in the human uterus upon its body, and likewise circular and concentric at each corner of the fundus. When this internal stratum was removed, the fasciculated appearance and regular direction of the fibres was less and less apparent in proportion as I dissected outwards, which seemed in a great measure to be owing to the infinite number of the branches and communications of the large veins. The outer stratum in general was firmer and less vascular, that is, had fewer large vessels, and therefore was more dense than the middle and inner stratum. But the lateral parts of the uterus, where both the spermatic and hypogastric vessels come to it and anastomose upon its outside, are excepted in this general observation.” (*Description of the Gravid Uterus*, p. 24.) Compare succeeding specimens, especially No. 48.25, which is a second uterus which William Hunter afterwards obtained, and on which he made further observations agreeing exactly with the above description.

48.21. Internal Muscular Fibres of the Uterus.*Hunterian. RR. 12.*

"A portion of the same near the cervix; the fasciculi of muscular fibres appear parallel and forming circles parallel to os tincae"—the circular fibres of the lower part of the uterus. See preceding specimen.

48.22. Disposition of the Muscular Fibres around the Internal Orifices of the Fallopian Tubes.*Hunterian. RR. 63.*

A portion of a gravid uterus, similar to No. 48.20, illustrating the above.

48.23. Internal Muscular Layer of the Fundus Uteri.*Hunterian. RR. 14.*

"Fundus uteri contracted, after delivery a few days, inverted, shows muscular fibres concentric to and around the orifices of the Fallopian tubes, and nearer the middle concentric to the cavity of the uterus." A portion of the decidua still adheres on the one surface between the tubes; on the other the muscular fibres, carefully cleaned, are seen interlacing irregularly. Bristles in the tubes.

48.24. Concentric Muscular Fibres around the Inner Orifice of the Fallopian Tubes. *Hunterian. RR. 15.*

Similar to No. 48.22, the veins injected yellow.

48.25. "The Whole Gravid Uterus at the Ninth Month, turned inside out to show its Muscular Fibres."*Hunterian. RR. 16.*

"The one engraved, see *Anatomy of Gravid Uterus*, Pl. XIV., figs. 1, 2, 3" (by some unaccountable error the reference in the old catalogue is to "Pl. VI." There are several such errors). The title of the plate is as follows: "From a fourth subject at nine months. This shows the disposition of the muscular fasciculi on the inside of the womb, in three different views. The part was steeped in water for some days, whereby the decidua was made tender, and then brushed off." This description of the condition of

the interior of the uterus after labour should be compared with that under specimen No. 48.20, which tends to convey the impression that William Hunter agreed with the erroneous opinion that the muscular wall of the uterus was laid bare at every confinement. On the contrary, from this and other passages in his works (*e.g.* on pp. 25 and 47 of Rigby's edition of the *Description of the Gravid Uterus*), it is evident that he knew that "one stratum of the decidua is always left upon the uterus after delivery"; compare No. 48.90, which shows a uterus at full time emptied and inverted. The specimen, from long maceration in too weak spirit, is not as plain as it once was. It was described as showing the two orders of "concentric fibres around the orifices of the Fallopian tubes," which "meet or become reciprocally tangents" on the "middle of the fundus of the womb," the third order of fibres "going circularly round the body of the womb," and "the triangular interstice between the three orders of circular fibres, where they all blended, and take a variety of directions." One surface shows the seat of adhesion of the placenta, "where the fibres form irregular interwoven bands, in the interstices of which were the orifices of the veins which went into the spongy part of the placenta." Compare Nos. 48.35-48.43, and 48.103, showing the placental site and the arrangement of the muscular fibres therein.

(c) *The Blood-vessels of the Gravid Uterus.*

48.26. Vascularity of the Gravid Uterus.

Hunterian. RR. 17.

"One side of the gravid uterus, also at the ninth month; arteries injected red, veins yellow, to show vascularity from without; the placenta is left adhering, and has its cells injected from the uterus." The yellow injection has dissolved, and the veins are mostly seen now as empty spaces.

48.27. The Blood-vessels of the Gravid Uterus.

Hunterian. RR. 18.

One side of the uterus, at full time, with the ovary, tube and broad ligament, and part of the vagina; the arteries injected red, the veins green. It is dissected to show the two sets of vessels, hypogastric and spermatic, by which the circulation of the uterus is carried on.

The veins are enormous—about five times the size of the arteries. The end of the spermatic is raised up from the specimen being hung by it on one side. The hypogastric reaches the side of the uterus at the level of the cervix.

48.28. The Blood-vessels of the Gravid Uterus.

Hunterian. RR. 176.

“Section of the uterus, with the placenta adhering; the cells of the placenta are injected red from the vessels of the uterus.” It is rather more than half of a uterus, about the sixth month probably, right side, and half of the bladder. Apparently both arteries and veins are injected red. They are finely dissected so as to show, as in the preceding, the two sets: (1) hypogastric, coming to about the level of the cervix; and (2) spermatic passing in along the broad ligament. These meet and form a great anastomosis in the walls of the uterus. Compared with the non-gravid uterus, the blood-vessels are greatly hypertrophied; the spermatic vessels especially look enormous, being fully distended by the injection. Under the site of the placenta the uterine wall is honeycombed with large vessels, the greater part of the increased blood-supply going to this organ. The specimen also shows the condition of the cervix at this period of gestation. It is considerably thickened and its cavity enlarged, but it is not shortened, nor has its cavity spread out and become merged in that of the body at all. Compare Nos. 48.44–48.50. The ovary is split open, showing a corpus luteum. Compare Nos. 48.51 *et seq.*

48.29. The Blood-vessels of the Uterus. *Hunterian. RR. 19.*

“The spermatic and hypogastric arteries and veins, injected on the gravid uterus upon one side; the former red, the latter yellow; very fine.” The specimen consists of the vessels dissected out and mounted separately. The injection masses, especially the yellow, are breaking down badly and falling out of the vessels.

48.30. The Blood-vessels of the Uterus. *Hunterian. RR. 29.*

“The other side of ditto; the trunk of the vein almost ten times the size of the artery.” Similar to the preceding.

48. 31. The Blood-vessels of the Vagina during Pregnancy.*Hunterian. RR. 157.*

“A portion of the uterus and vagina, vessels injected green. The vessels of the vagina are enlarged as well as those of the uterus.”

48. 32. The Vascularity of the Gravid Uterus. Independence of the Foetal and Maternal Circulations.*Hunterian. RR. 21.*

“One side of the gravid uterus at the sixth month, with placenta adhering; the red injection returned by the veins of the mother from the hypogastric artery; not a drop got into the cord though the uterus was exceedingly red; the cord was afterwards injected white and black.” This specimen demonstrates perfectly the independence of the foetal and maternal circulations. “Much has been said or supposed about a communication between these vessels and those of the uterus, but from all the experiments I have made upon the human subject (and upon quadrupeds likewise), it plainly appears that the umbilical arteries terminate in the umbilical veins, and not in the vessels of the uterus; and that the blood passes from the arteries into the veins, as in other parts, and so back to the child again.” (*Description of the Gravid Uterus*, p. 33.)

48. 33. The Vascularity of the Gravid Uterus. The Foetal Membranes.*Hunterian. RR. 22.*

The other part of the preceding. It shows the vascularity of the uterine wall, including both layers of the decidua, which are separated down near the cervix. At this point also the foetal membranes, which line the inner surface of the specimen, are separated to show the two layers—amnion innermost and chorion between it and the decidua reflexa. The cervix uteri is not shortened. The os externum is slightly patulous. Compare Nos. 48.44–48.50.

The membranes, amnion and chorion, are cut to allow a bristle to be passed through the Fallopian tube. A slice has been cut off the ovary to show in section a corpus luteum beautifully injected. Compare Nos. 48.51 *et seq.*

48.34. The Vascularity of the Gravid Uterus.

Hunterian. RR. 23.

"A portion of another uterus, highly injected red." Shows very strikingly the thick part of the uterine wall honeycombed with vessels, where the placenta was attached; also the oblique orifices of the veins, where they were torn across in the removal of that organ. Compare Structure of the Placenta, Nos. 48.83 *et seq.*

48.35. The Vascularity of the Gravid Uterus.

Hunterian. RR. 25.

A similar part of another uterus, "the arteries injected red, the veins yellow." The yellow has dissolved, and the veins are now empty. This specimen shows part of the area of attachment of the placenta, which is recognizable by the widely open mouths of the torn uterine veins.

48.36. The Vascularity of the Gravid Uterus.

Hunterian. RR. 26.

Another portion of the same.

48.37. The Vascularity of the Gravid Uterus.

Hunterian. RR. 26a.

"Portion of the gravid uterus, with the ovarium and Fallopian tube, highly injected red; surface of uterus partly covered by decidua, which is likewise seen injected from the vessels of the uterus. (Not described nor numbered.)"

48.38. The Blood-vessels of the Gravid Uterus. The Placental Arteries and Veins.

Hunterian. RR. 27.

"An inverted gravid uterus at the ninth month, arteries injected red, the veins yellow; there are large venal orifices on the inside surface, which were torn through in separating the placenta; the arteries nowhere form villi, but pretty coarse branches which are also seen torn through, by the sides of the torn veins; the whole exceedingly vascular." The orifices of some of the torn veins are filled by plugs of blood-clot; others are seen wide open, passing in very oblique directions into the muscular wall of the organ. The

upper part of the placental site closely resembles fig. 3 of Pl. X. of Hunter's *Gravid Uterus*.

48.39. The Placental Surface of the Uterus.

Hunterian. RR. 28.

"An uterus, turned inside out; shows a downy irregular surface; the place where the placenta adhered rougher than any other, and remarkable for broken orifices of veins plugged with coagulated blood."

48.40. The Internal Surface of the Gravid Uterus after Removal of the Placenta.

Hunterian. RR. 30.

"Another uterus inverted, but at the sixth month apparently; placenta seems to have adhered to the fundus uteri." Similar to the preceding.

48.41. The Site of Attachment of the Placenta.

Hunterian. RR. 31.

"A portion of the uterus at the place where the placenta adhered, the orifices of the torn veins full of large plugs of coagulated blood; very remarkable."

48.42. The Oblique Veins of the Uterus at the Site of Attachment of the Placenta.

Hunterian. RR. 33.

"A portion of the uterus, in which the arteries had been injected red, the veins yellow; shows inside surface and the torn orifices of the veins filled with yellow injection." The yellow injection has mostly dissolved and disappeared, but has left the orifices of the veins wide open. Shows the oblique passage of the veins from the uterus to the placenta very prettily. Compare Nos. 48.38 and 48.39. Shows also the "curling arteries of the placenta."

48.43. The Site of the Placenta.

Hunterian. RR. 34.

A portion of uterus showing the orifices of the torn veins in the site of the placenta plugged with blood clots.

(d) *The Changes in the Cervix and Os Uteri at Different Stages of Pregnancy.*

See also Nos. 48.33, 48.34, 48.111, 48.112, 48.113, 48.153, 48.155, 48.156, and 48.158.

48.44. The Cervix and Os Uteri in the Last Month of Pregnancy. *Hunterian. RR. 35.*

“Os tincae from the gravid uterus at the ninth month.” The cervix with a ring of vagina, into which project the greatly hypertrophied lips of the os. The os itself is a narrow transverse slit about 2 cm. long. The cavity of the uterus has decidedly encroached upon the cervix, though the dilatation of the os externum by labour had clearly not begun.” From the thickness and irregularity of the os it is evidently that of a multipara. Compare No. 48.49.

48.45. The Cervix and Os Uteri in the Last Month of Pregnancy. *Hunterian. RR. 36.*

“Os tincae from the gravid uterus at the ninth month. It projects a little way into vagina; bristles are introduced into the follicles, which secrete the gelatinous fluid which blocks up the cervix: in this and the preceding preparation cervix is seen on the posterior side.” The os had begun to dilate. It measures nearly 3 cm. by 5 mm., and its depth is only about 6 mm. The cavity of the cervix is encroached upon still more than in the preceding. It is flattened out from above, and its rugae pennatae are seen looking up towards the general cavity of the uterus; they are so distinct that the subject was probably a primipara. Compare No. 48.49.

48.46. The Cervix Uteri in Advanced Pregnancy.

Hunterian. RR. 37.

“A portion of the uterus at the ninth month.” A portion of the os tincae, cervix uteri, and vagina slit open and laid out flat. The cervix is not shortened, but appears to have been opening out in its upper part. The muscular wall is greatly hypertrophied. The mucous membrane is thickened and honeycombed with the glandular

lacunae which secrete the mucous plug, which usually occupies the cavity of the cervix.

48.47. The Cervix Uteri in Advanced Pregnancy.

Hunterian. RR. 38.

"A beautiful cervix uteri; shows the rugae pennatae well, and the follicles of the os tincae passing some way up the cervix." It is slit on one side and laid flat, and hung by one side. Probably at an earlier period than the preceding.

48.48. The Cervix Uteri in the Ninth Month of Pregnancy.

Hunterian. RR. 40.

"A side view of the cervix uteri in its shut state, also of the vagina and bladder; the jelly also seen filling up the lower part: from the gravid uterus at the ninth month." The cavity of the cervix is narrow and still fully an inch (2.5 cm.) long. The cavity of the uterus opens up abruptly above it. The specimen also shows the relation of the bladder and urethra and vesico-vaginal pouch of the peritoneum to the vagina. From the other side it shows the depth of the recto-vaginal pouch (pouch of Douglas). Compare Nos. 48.111 and 48.112.

48.49. The Cervix Uteri in a Primipara "at Full Time."

Hunterian. RR. 110.

"Cervix uteri and os tincae from an uterus at full time of pregnancy, after it had somewhat contracted itself; os tincae appears twice larger than in the unimpregnated uterus, being fully half an inch in length." The internal os is still quite small; it would hardly admit a writing pencil. The cervix is not shortened. The absence of cicatrices about the os shows it to have come from a primipara.

48.50. The Plug of Mucus in the Cervix Uteri.

Hunterian. RR. 134.

Described as "an uterus at a very early period of pregnancy, with the cervix blocked up by jelly." The specimen, however, shows no sign of pregnancy. The cervix, both in the virgin and in the pregnant condition of the uterus, is often found filled with

mucus, which is often very firm; but as there is no evidence that this interferes with impregnation or menstruation, it can hardly be said to "block it up."

(e) *The Ovary during Pregnancy. The Corpus Luteum.*

48.51. Corpus Luteum of Pregnancy. *Hunterian. RR. 43.*

"An ovarium and Fallopian tube, with a portion of the gravid uterus adhering; the tube is distended with spirits, and is larger at the end next the ovarium than the barrel of a writing pen; ovarium slit open, shows corpus luteum very large, as big as a hazel nut, with cavity nearly as large, so that the sides are very thin." Compare No. 48.153, which shows a corpus luteum at the beginning of the fifth month, and No. 48.155, which shows it in the fourth month.

48.52. Corpus Luteum of Pregnancy. *Hunterian. RR. 44.*

Fallopian tube, broad ligament, and ovary, the last split open showing the above. Probably about the middle of gestation. "Cavity not so large, and the side of the corpus luteum pretty thick, and its substance radiated round this cavity." The fleshy yellow wall is composed of the hypertrophied inner coat of the ovisac, and the above-mentioned radiated appearance is due to its doubling up under pressure by the limiting outer coat of uterine stroma. Compare No. 48.59, which is an injected specimen.

48.53. Corpus Luteum of Pregnancy. *Hunterian. RR. 45.*

A similar specimen, "cavity of corpus luteum still less, and the sides in proportion thicker; a bristle is introduced into the Fallopian tube, at the end next the uterus; its orifice there would admit a fine probe."

48.54. Corpus Luteum of Pregnancy. *Hunterian. RR. 46.*

Similar to the preceding. "Fallopian tube slit up its whole length, and thrown into longitudinal rugae on its internal surface; a bristle in both orifices; corpus luteum also slit open, and a

bristle in an orifice apparently leading into its cavity, which is here less, as is the whole bulk of its body." William Hunter says of this little pit or cicatricula on the outside of the corpus luteum: "In the cases which I have seen no bristles would pass; it appears to be an obliterated duct or passage grown together." It is not a passage, but only a depression, a scar, corresponding to the point at which the Graafian follicle ruptured. (*Lectures*, MS. R.C.S. Eng.)

48.55. Corpus Luteum of Pregnancy and False Corpus Luteum.

Hunterian. RR. 48.

"A section of corpus luteum, highly injected red. The cavity is white and carries no vessels apparently, but the surrounding glandular substance is as vascular as any thing in the body; at some little distance are seen the remains of a former corpus luteum, in which the glandular substance is lost, and the mere cavity remains." The appearance of the latter body strongly suggests that it is not a "former corpus luteum," but a so-called false corpus luteum of Dalton, *i.e.* a Graafian follicle which has not ruptured, but has degenerated and remained buried in the stroma of the ovary. See also under No. 48.57.

48.56. Corpus Luteum at a Late Stage of Gestation.

Hunterian. RR. 51.

"Fallopian tube and ovarium; the latter slit open shows a pretty large corpus luteum, with a very small cavity." The wall very thick and fleshy.

48.57. Corpus Luteum of Pregnancy at Term.

Hunterian. RR. 52.

"Fallopian tube and ovary, from a woman who died undelivered (at Knightsbridge); she died of her third child; ovarium is slit open; there are three corpora lutea—one recent and two old ones; the first has a very large cavity." The appearances do not warrant the above description. There is one corpus luteum, probably related to the pregnancy, but the other two bodies appear to be simply, the upper a large Graafian follicle, and the lower a false corpus luteum of Dalton—an unruptured and degenerated Graafian

follicle. Compare No. 48.55. The number of corpora lutea (or bodies resembling them) in an ovary is not now (nor in fact was it by William Hunter) regarded as any indication of the number of pregnancies that have occurred. The corpus luteum of pregnancy disappears completely within a few months of delivery. See also under next number.

48.58. Corpus Luteum of Ovulation without Impregnation and Graafian Follicles. *Hunterian. RR. 52a.*

“An uterus from the dissecting room, slit open ; the internal surface of the uterus is rough ; the ovaria slit open show on one side a large corpus luteum, and on the other the remains of three or four former ones ; from these circumstances we concluded the woman had formerly had children, and was at the time she died pregnant.” The significance attributed to appearances such as are seen in this specimen is very different now from what is indicated in the above description. The so-called corpus luteum is possibly a corpus luteum of ovulation without impregnation ; but as there is no trace of rupture, it is probably only a ripe Graafian follicle, in which the yellowish inner coat (which forms the characteristic fleshy layer of the corpus luteum) is unusually thick and irregular. It is not a corpus luteum of pregnancy. The other bodies are simply Graafian follicles in various stages of development. The appearance of the cervix uteri is characteristically virgin. There is no indication in Hunter’s *Gravid Uterus*, or in his lectures, that he held such opinions as are expressed above. He mentions the occurrence of the corpus luteum, but does not express any opinion as to its significance, beyond mentioning “that in all bodies who have died pregnant soon after conception, there is what has been called a corpus luteum in one ovarium, which has been looked on as the calyx of the ovum, which ovum has been thought to be taken up by the Fallopian tubes and carried to the uterus. Whether this be calyx which contained the ovum, or whether it be a glandular substance separating the female seed, I cannot pretend to say ; but in general if you cut up the two ovaries, you will find in one a glandular round substance, extremely vascular; and by examining women who have died early I have found that it is always hollow. In the later months it is contracted, so that there is no cavity and only a white speck in the middle. What is very remarkable, there are never two corpora lutea found in a woman big with only one

child, but in two women that had twins there were in each of them two corpora lutea. In one woman there were two together in one ovarium." (Cases of twins arising from ova from two distinct Graafian follicles. Both ova becoming impregnated, both follicles developed into corpora lutea.) See also under next specimen. (*Lectures*, MS. R.C.S.Eng., 42, c. 31, p. 73.)

48.59. Corpus Luteum of Pregnancy at Term.

Hunterian. RR. 53.

This specimen is the one figured in Hunter's *Gravid Uterus*, Pl. XV., fig. 5. It is described as "the right ovary and tube," from the uterus of a woman who, "immediately after a natural labour at the full time," "grew faint, as was said, without apparent cause and died within the space of two hours." "The arteries were injected with red wax." It shows "the ovary cut open, with serpentine arteries interspersed through its substance," and "in the substance of the ovary the corpus luteum is seen split through the middle. No vessels appear at its centre, which is of a white complexion; but all around that centre its substance is very vascular." It is small, having passed its highest development and been contracting for some months. Compare No. 48.33. The hypertrophied tunica propria of the ovisac forms the highly vascular layer, and the white avascular centre is the remains of the blood clot which formed in the cavity of the emptied follicle. The Fallopian tube is cut open. Its lining membrane and the row of fimbriae, between its orifice and the outer end of the ovary, appear highly vascular.

48.60. Corpus Luteum of Pregnancy at Term.

Hunterian. RR. 57.

"Fallopian tube and ovarium at birth; corpus luteum large, its cavity triangular." The corpus luteum is only about one centimetre in diameter.

48.61. Corpus Luteum of Pregnancy. *Hunterian. RR. 418.*

Part of the Fallopian tube and ovary, during pregnancy, injected red, showing a large corpus luteum projecting from the ovary. A small portion of the apex has been torn out to show the glandular looking vascular flesh, derived from the inner coat of the Graafian follicle, and in the centre a part of the avascular contents. (Not described in the old catalogue.)

48. 62. Corpus Luteum of Pregnancy. *Hunterian. RR. 114.*

"A Fallopian tube and ovarium; in the centre of the ovarium there is a very distinct corpus luteum, having a large cavity which contains some white coagulated matter."

48. 63. Corpora Lutea nearly Cicatrized. *Hunterian. RR. 54.*

"Ovary split open; two corpora lutea, but both small, in it." Illustrates an advanced stage in the conversion of the corpus luteum into a cicatrix.

48. 64. Corpus Luteum. *Hunterian. RR. 55.*

"Ovary slit open; corpus luteum with little or no cavity."

48. 65. The Fallopian Tube and Ovary. Corpus Luteum.
Hunterian. RR. 55a.

"Fallopian tube filled with spirits, to show its size; ovarium slit open shows a small corpus luteum, with a considerable cavity."

48. 66. The Fallopian Tube and Ovary. Corpus Luteum.
Hunterian. RR. 55b.

A similar preparation showing the size of the Fallopian tube. Also a "corpus luteum very large, but no apparent cavity or orifice."

48. 67. Calcification of Corpus Luteum. *Hunterian. RR. 56.*

"Fallopian tube of one side, with both ovaria; in the uppermost is seen corpus luteum entire, like a small pea, separated from its bed nearly. There seem to be the remains of one in the under ovarium." The pea-like body is a calcified corpus luteum. At one point the yellow calcareous mass is seen exposed through a tear in its fibrous envelope. The object in the other ovary is a false corpus luteum of Dalton. Both ovaries are small and wrinkled; probably from an old subject.

48. 68. The Fallopian Tube and Ovary. False Corpus Luteum. *Hunterian. RR. 113.*

"A Fallopian tube and ovarium laid open, showing the fimbriae continued to the ovarium, and showing some very obscure appear-

ance of a corpus luteum." Another very wrinkled ovary. The white object mentioned above is deeply embedded in the ovary, and is probably a degenerated Graafian follicle which has never ruptured—a false corpus luteum of Dalton.

Comparative Anatomy of the Corpus Luteum.

48.69. Corpus Luteum in Ovary of Cow.

Hunterian. RR. 59.

"Corpus luteum and Fallopian tube, from the cow; in spirit of sea salt, with distilled water. It appears rather dissolving, but shows corpus luteum three or four times larger than the human, of a deep yellow colour, and with a small cavity; its substance also radiated round the cavity." (Had been remounted in spirit, and is now (1896) again mounted in that.)

48.70. Corpus Luteum in Ovary of Cow.

Hunterian. RR. 61.

An ovary of a cow split open, showing the above in section. Similar to the preceding. Rather more than 2 cm. in diameter.

48.71. Advanced Corpus Luteum in Ovary of Cow.

Hunterian. RR. 62.

Ovary of cow injected and split open, showing a corpus luteum not much larger than a pea, its fleshy wall "very vascular and the cavity somewhat triangular and narrow."

48.72. Corpus Luteum in Ovary of Cow.

Hunterian. RR. 63.

"Ovary of cow, uninjected. Corpus luteum divided into different sections, to show texture; a bristle also points to an apparent orifice." Compare No. 48.54. There is also a Graafian follicle divided showing its cavity.

SECTION II.

THE CONTENTS OF THE PREGNANT UTERUS : FOETUS, MEMBRANES,
AND PLACENTA—THE HUMAN OVUM.(a) *Entire Human Ovum.***48.73. "A Child at Birth, enclosed in its Amnion, with its Placenta, giving an idea of an Entire Human Ovum."***Hunterian. RR. 65.*

Apparently, from the size of the foetus, about the seventh month. "The vessels of the placenta, unravelled and hanging loose and floating," the maternal decidua between them having been removed by maceration and teasing, leaving almost purely foetal tissues. "The contents of the pregnant uterus are the secundines, liquor amnii, and the foetus. The secundines make the lining of the uterus and the immediate covering of the child; they form the chain of connection and communication between the bodies of the mother and child, and carry on that wonderful influence upon which the life and health of the child depends. There is an obvious division of them into the navel string, the placenta, and the membranes." (*Description of the Gravid Uterus*, p. 27.)

48.74. Complete Human Ovum : Foetus, Amnion, Chorion, and Placenta.*Hunterian. RR. 66.*

A similar specimen mounted in a globular glass jar with flat glass top. "Exceedingly perfect: chorion also adhering, but removed at one part to show amnion more transparent underneath, and foetus more distinct under it." About the seventh month; slightly larger than the preceding. It is very surprising that such a large ovum should have escaped rupture of the membranes in its expulsion from the womb.

48.75. Complete Human Ovum.*Hunterian. RR. 67a.*

The contents of the uterus, "at full time or nearly so." The foetal membranes, chorion and amnion are split and slightly retracted to show the foetus suspended by the head. Its limbs

are folded in front so as to take up as little room as possible. The placenta lies to the left side of the foetus. It is slightly torn, which shows its natural lobulation. The ragged yellow tissue adhering to the outside of the chorion is remains of the decidua.

48.76. A Human Ovum about the Sixth Month.

Hunterian. RR. 99.

Similar to No. 48.73, but smaller. Compare No. 48.154.

48.77. Human Ovum about the Fifth Month.

Hunterian. RR. 139.

An almost entire human ovum about the fifth month of utero-gestation, uninjected. Part of the decidua is removed, showing the chorion and amnion, with the foetus inside them. The fluid in the amnion had become very turbid. In 1896 it was washed out with spirit, which now (1898) remains fairly clear. Compare No. 48.154.

48.78. Uterus containing Twins enclosed in one Amnion.

Hunterian. RR. 68.

"Uterus at birth, opened on one side, and twins seen *in situ* bent in such a posture as to take up as little room as possible."

(b) The Umbilical Cord or Navel String.

48.79. The Umbilical Cord.

Hunterian. RR. 79.

"A navel string injected with quicksilver; coiled round a thick piece of wood." The vein and the two arteries have all been injected. Most of the mercury has escaped from the former, which is recognized by its emptiness and much greater size.

48.80. False Knot on Umbilical Cord. *Hunterian. RR. 80.*

"Part of a navel string inflated and dried, to show convolutions of the artery resembling knots at one end." The vein also partakes in the convolution of vessels constituting the false knot.

48.81. The Urachus.

Hunterian. RR. 81.

"The lower half of a foetus at four months; abdomen opened

shows the bladder turgid with quicksilver, to prove the urachus is impervious; in the place of the urachus a ligament is seen dissected off from between the arteries; this is continued all the way to the placenta." William Hunter held the erroneous opinion that the allantois did not exist in the human embryo. He states, in the *Description of the Gravid Uterus* (p. 53), that "Quadrupeds, great and small, have an allantois; in all of them the membrane itself is distinctly visible; the urachus is easily seen; any fluid thrown into the bladder passes without difficulty along the navel string, and fills the allantois; two collections of fluid, viz., liquor amnii and urine, are seen and distinguished at first sight. From these facts we might presume, *a priori*, that there were similar appearances in the human subject, and these as much more striking in the human foetus than they are in a kitten, as that is larger than this. But in fact none of these appearances are seen in the human subject, and therefore we must conclude that the similar parts do not exist." The allantois is now known to be formed in the human embryo, but to attain only a very small size, and to become very early unrecognizable to the naked eye. Its stalk, the urachus, persists as the ligamentous thread rising from the apex of the bladder and running out into the umbilical cord, which is shown in this and the succeeding specimen. See the general introduction for discussion of William Hunter's views. Compare Comparative Anatomy specimens Nos. 48.253-256, and 48.259 and 260.

48.82. The Urachus.

Hunterian. RR. 82.

"A portion of the cord spread open, to show this ligamentary substitute of urachus in its centre."

(c) *The Fully Developed Placenta and Membranes.*

Specimens Nos. 48.83 to 48.103, illustrate in a general way most of the points in the anatomy of the placenta and membranes, from mid-term to the end of gestation, as described by William Hunter. Then from 48.104 to 48.158 the specimens traverse the same ground, but in more detail. This arrangement is that which was followed in the old catalogue, and it was considered right to follow it in the new on account of the large number of specimens available.

(A) THE PLACENTA AND DECIDUA IN GENERAL.

48.83. The Placenta at Full Time; the Decidua covering its Outer Surface.*Hunterian. RR. 84.*

"A very large placenta, injected red; showing its size, and on the under side its lobulated appearance. Injected by the umbilical arteries." The decidua covering its outer surface remains uninjected; compare No. 48.123. "The human placenta, as well as that of quadrupeds, is a composition of two parts intimately blended—an umbilical or infantile and an uterine portion. One is a continuation of the umbilical vessels of the foetus, the other is an efflorescence of the internal part of the uterus." (*Description of the Gravid Uterus*, p. 33.)

"The placenta and membranes together make one complete unimperforated bag, which lines the uterus and contains the child. (Compare specimens Nos. 48.73 and 48.74.) The placenta is thick, fleshy, and exceedingly vascular; the membranes are thin, pellucid, and, for the most part, have scarcely any apparent red blood-vessels.

"The figure of the placenta is commonly round and flat, about an inch in thickness, and about a span in breadth. It becomes gradually thinner all round its edge, so as to render the change from the placenta to the membranes more imperceptible. The above-mentioned thickness of the placenta is meant of the common flaccid state in which we usually see it; but when its cellular part is well filled with wax, or any fluid, the placenta is at least two inches thick. Though its figure is generally round, it is often oblong or triangular, or of an irregular shape, and sometimes it has a small lobe or two separated and entirely distinct from the rest. I have seen it oblong and narrow in the middle, like the cipher, or like the common placenta of twins united by an isthmus. When the placenta is very long and narrow, and the navel string is inserted near one end, it is apt to remain in the uterus a considerable time after the birth of the child, and to occasion flooding and faintness before it comes away.

"The outer surface which adheres to the womb, and is therefore naturally convex, is rough, tender in its substance, commonly covered with blood, lightly subdivided into smaller constituent lobes, and to a common observer seems to have no apparent blood-vessels or at least none of any considerable size.

"Its internal surface, naturally more or less concave, is glossy,

hard and compact in its texture, and beautifully marked by the ramifications of the umbilical vessels. The navel string, which produces these branching vessels, is inserted sometimes into the very centre, but more commonly a little nearer the edge, and often into the very edge of the placenta. In at least four different cases, I have seen the navel string terminate on the inside of the membranes at a distance of five or six inches from the placenta. In all these cases the umbilical vessels parted from one another, even to a considerable distance in their course upon the membranes, and came to the edge and inner surface of the placenta at different places, even at the opposite parts. The termination or insertion of the navel string, wherever it happens to be, makes the centre of ramification for the large vessels on the internal surface of the placenta. The internal surface of the placenta is covered with the membranes amnion and chorion, and the external with the decidua, of which hereafter." (*Description of the Gravid Uterus*, p. 31.) The decidua is described under No. 48.106.

48.84. The Placenta and Umbilical Cord.

Hunterian. RR. 85.

A similar specimen, "very beautiful; arteries red, and veins yellow, injected with yolks of eggs." The process of preparing a placenta for injection, as described in the *Description of the Gravid Uterus* (p. 34), is as follows: "After common labours the placenta is generally more or less torn, and its vessels contain a quantity of coagulated blood; on both of which accounts it is unfit for a successful injection. I have generally taken care, by a previous management, to procure a favourable subject, and would recommend the same method to those who have the opportunity, viz., when the navel string is tied and cut, not only to allow the end of the string to bleed from the placenta, but milk it continually till the placenta comes down into the vagina; and, in taking that away, be slow, cautious, and gentle, leaving it principally to the gradual pressure from the mother, and very gently pulling by the navel string; thus it will neither be bruised nor torn, and it will be almost empty of blood. Instantly put it into a basin of warm water, with the inner surface upwards. What blood remains in the vessels will still be fluid enough to be pressed from those on the surface of the placenta into and then along the vessels of the string. Then turn up the external surface, wash and press it very gently,

and clear it of all coagula, either upon its surface or in the venal orifices, and the whole will be almost without blood." The umbilical vascular system may then be injected either from the artery or vein of the cord; and "if the placenta be whole in all its substance, which is seldom the case, and its blood-vessels be pretty well emptied of their blood, any subtile injection thrown into the artery will fill the arterial system throughout the whole substance of the part to an amazing degree of minuteness, and return so freely by the veins as to fill them very generally and equally. In the same manner the whole umbilical system may be filled by injecting the vein, the fluid returning from the veins into the arteries. In both these experiments the injected fluid is confined to the umbilical vascular system, none escaping at the external surface of the placenta, neither by large nor small orifices whether of veins or arteries."

48. 85. The Placenta at Full Time. The Decidua.

Hunterian. RR. 86.

"Placenta with part of umbilical cord, injected also with yolks of eggs; the vessels thence more rounded and full; the arteries red, the veins green from verdigris." This specimen is an example of the insertion of the cord near one edge of the placenta, an abnormality called "battledore placenta."

48. 86. A Placenta injected red and mounted in Turpentine.

Hunterian. RR. 87.

At one side it is cut, and in the section the fine red injected foetal vessels can be traced almost to the outer surface. Almost all over this surface there is a thin layer of decidua, of varying thickness, having a clear horny appearance due to the mode of preparation. This layer is clearly not injected. Only where it has been torn off are the injected vessels of the foetal villi visible in the outer surface of the placenta. See description of No. 48. 106.

48. 87. A Placenta, of which both the Arteries and Veins are injected with Mercury.

Hunterian. RR. 87a.

In a flat dish. Some of the vessels now empty and collapsed. The cord lies by the side of the placenta. (Not described.)

48.88. A Placenta and Umbilical Cord, Arteries injected red, Veins yellow. *Hunterian. RR. 87b.*

It is dried, varnished, and mounted in a round glazed frame. It had become exceedingly dirty, and was therefore cleaned with spirit, sized, and varnished in December of 1896. The branches of the vessels can be traced to considerable fineness. The twisting of the cord and its arteries and vein are also well displayed.

48.89. Uterus and Foetus at about Five Months. The Decidua and Placenta. *Hunterian. RR. 89.*

An uterus at about five months, laid open on one face by a crucial incision, and inverted. One of the cuts extends from near the os internum to the fundus, the other from side to side. The placenta is left adhering, and the foetus is suspended above the uterus, the cord intact. The opaque membrana decidua has been stripped from the muscle all round the placenta, showing its thickness and characteristic cribriform appearance, and the muscular fibres behind it. At the right side of the specimen (left of the observer) the cervix and part of the vagina can be seen inside the inverted uterus. The internal os is then recognized looking outwards. Beside it is a circular orifice formed by the margin of the decidua vera, where its neck has been divided at the point of union with the mucous membrane of the cervix. Shows that the decidua is uterine mucous membrane, modified for a particular purpose.

48.90. Uterus at Full Time, Emptied and Inverted, showing the Condition after Labour.

Hunterian. RR. 90.

“An uterus at full time, cut open and inverted; in some places the muscular fibres are nearly bare, in other places portions of the membranes are left adhering. There is an uncommon roughness at one part, where the placenta had adhered.” Compare this description of the interior of a uterus at the full time, either after natural labour or after artificial removal of the foetus and membranes (which at this period of pregnancy would amount to much the same thing in so far as the structures taken and left are concerned), with the descriptions of specimens Nos. 48.20 and 48.25. The mouths of the torn veins in the placental site (decidua serotina) are blocked with fibrinous plugs.

48.91. "A Section of Uterus, with the Placenta partly adhering and partly detached, showing in the Angle the Mode of Adhesion." *Hunterian. RR. 113.*

In the angle are seen the stretched fibres of the decidua serotina and the blood-vessels passing from the uterus to the placenta, some partly torn across. The placenta is the portion to the left of the observer. This appearance is described in the description of Pl. XXI. of Hunter's *Gravid Uterus*, as follows: "In this angle, between the womb and the secundines, the artist endeavoured to express what was very apparent in the object, viz., the continuity of the substance of the womb and of the secundines; in parting which, the tender connecting medium, the decidua, separated into two layers, one of which clung to the womb, and the other to the chorion."

48.92. The Placenta. Maternal Arteries and Veins.

Hunterian. RR. 96.

"A portion of a placenta and its membranes: on the surface which adhered to the uterus may be seen some very small curling arteries injected red, and veins injected black which are going to the cells of the placenta." The black injection is breaking down.

48.93. The Vascularity of the Placenta. The Chorion.

Hunterian. RR. 97.

"A section of the placenta, highly injected from the navel string; showing its vascularity; and showing besides, the amnion, chorion, and decidua." The placental substance in this appears a spongy mass of red-injected blood-vessels; these are the vessels of the chorionic villi, which compose the foetal part of the organ (compare Nos. 48.159, *et seq.*), and they are so numerous and so finely injected as to appear to constitute the greater part of the villi; compare No. 48.134*a*. The layer of decidua covering the uterine face of the placenta is uninjected. (Compare No. 48.106; nature of the decidua.) The amnion floats partly separated from the inner face of the chorion. The membranous layer of the chorion has been torn from the villous part, which forms the placenta. "By this membrane (the chorion) is here meant that which lies on the outside of and next to the amnion; it is transparent like the amnion, but much more thin and tender. It is

so extended as to make a complete bag, which encloses that membrane and all its contents, and is everywhere connected with that immediate involucrum of the child and water by the gelatinous medium above described" (Wharton's jelly; embryonic connective tissue), "except upon the navel string; there the amnion and chorion are intimately and inseparably connected as one membrane, of which the inner lamella is a production of the chorion." "Where it is expanded over the concave surface of the placenta it acquires considerable thickness and strength, and is so intimately connected with the superficial branches of the umbilical vessels that it seems to give them a coat, or they seem to run in a duplicature of its substance till they emerge in smaller branches to disperse themselves through the different lobes of the placenta.

"At the membranous portion of the secundines the chorion adheres so firmly to the more external membrane or decidua, that it is often difficult to separate them in recent secundines. Gentle putrefaction makes them part readily; and in separating these two membranes especially near the edge of the placenta, we may always observe a number of white slender threads, which emerge from the substance of the chorion and ramify into smaller filaments upon the interior lamella of the decidua which was originally the decidua reflexa. These are the remains of those shaggy vessels" (chorionic villi) "which shoot out from the chorion in a young conception, and give the appearance of the ovum being altogether surrounded by the placenta at that time." (*Description of the Gravid Uterus*, p. 45.) Compare Nos. 48.159 *et seq.*, Development of the Ovum.

48.94. The Vascularity of the Placenta. Foetal Vessels.

Hunterian. RR. 97a.

Another portion from the same placenta as the preceding.

48.95. The Vascularity of the Placenta. Foetal Vessels.

Hunterian. RR. 98.

Another portion of the same.

48.96. The Vascularity of the Placenta. Foetal Vessels.

Hunterian. RR. 168.

A similar specimen, dried and mounted in turpentine.

48.97. Injection of the Foetal Vessels, and also of the Intervillous Blood-spaces of the Placenta.*Hunterian. RR. 98a.*

A portion of a similar placenta, in which there are seen also several of the uterine veins injected black. In the lobule corresponding to these veins, the red injection of the foetal vessels is seen amidst the black of the maternal blood spaces.

48.98. Placenta Unravelled. Foetal Vessels.*Hunterian. RR. 112.*

"A portion of placenta very highly injected and unravelled, appearing to be a beautiful shag of vessels." Injected from the umbilical cord so as to fill the vessels of the highly developed foetal villi, which form the main mass of the placenta.

48.99. Uterine Veins and Maternal Blood-spaces ("Cells") of the Placenta.*Hunterian. RR. 100.*

"A small section of placenta, with part of the membranes: the cells of the placenta have been filled from the veins of the uterus, or vice versa; the cells are not very large; on the side which adhered to the uterus, the veins may be seen very distinctly." The upper part of the specimen shows a number of large plugs of injection, which have occupied large uterine veins underlying the decidua close to the placental area. The lower part is a portion of the placenta; the injection appears in granules of various sizes, occupying the maternal blood "cells" (intervillous spaces) of the placenta. The small size and regularity of the granules shows that they are not extravasated but occupy natural cavities.

48.100. Uterine Veins of the Placenta. *Hunterian. RR. 101.*

A portion of a uterus "where the veins had been injected black," the placenta torn away showing the irregular plugs of injection in the orifices of the uterine veins.

48.101. Section of the Uterus and Edge of the Placenta.*Hunterian. RR. 111.*

"A section of the uterus with the placenta adhering, showing difference of structure and comparative thickness of each: the

veins of the uterus are seen very large and numerous." Shows also the spongy texture of the placenta due to the intervillous spaces (maternal blood-cells) being empty.

48.102. Uterine Placental Veins. *Hunterian. RR. 103.*

"A section of the uterus, injected by the veins a dark green, the veins are very large, and on the inside there is a breaking off of the injection and large orifices, where the veins were ruptured and had passed to the placenta." The injection has dissolved but the empty mouths of the veins are very distinct.

48.103. Muscular Fibres about the Orifices of the Uterine Veins of the Placenta. *Hunterian. RR. 105.*

"A section of the uterus injected red with fine injection, and inverted; it seems to have been previously dried; on the inside may be seen lying over bristles, irregular fasciculi of muscular fibres, the fibrous appearance of which is very distinct." The bristles lie in the oblique orifices of veins, passing in by one and out by another, which shows the free anastomosis existing between the uterine veins after they emerge from the placenta. The arrangement of the muscular fibres about the placental veins of the uterus, shown here, is supposed to be of great importance in the arrest of haemorrhage after separation of the placenta in labour, because, when the uterus contracts, they constrict the mouths of the torn veins, and prevent the plugs of blood clot blocking them from being dislodged. Compare No. 48.25.

(B) THE DECIDUA AND FOETAL MEMBRANES AT ADVANCED STAGES OF GESTATION.

48.104. The Decidua. *Hunterian. RR. 106.*

"A section of uterus, with membranes partly turned down, and showing a double layer of decidua." The exact date of the preparation in relation to impregnation not known—apparently in the latter half of pregnancy. The uppermost of the turned down laminae is the outer (or deep) layer of the decidua, which is also called the spongy layer from being pervaded by

numerous holes—the cavities of dilated tubular glands; compare particularly Nos. 48.113, and 48.113*a*. The second lamina is the dense inner (or superficial) layer of the decidua; the third is the chorion, and the lowermost is the amnion, which is the innermost membrane of all and next to the embryo.

48.105. The Decidua.

Hunterian. RR. 107.

“A section probably from the same uterus; where, however, one lamina of decidua is left entirely adhering; but the preparation in every other respect resembles No. 106” (preceding) The outer (*i.e.* deep) layer shows distinctly the pits which represent the ends of the dilated uterine glands. Compare No. 48.113*a*.

48.106. The Decidua at Six Months, showing that it is Hypertrophied Mucous Membrane of the Uterus.

Hunterian. RR. 108.

A section of the gravid uterus, injected blue by the uterine veins, red by the uterine arteries. This specimen is figured in Hunter's *Gravid Uterus*, Plate XXIV., figs. 3 and 4 (the arteries and veins of the decidua being figured separately “to avoid confusion”). The fact of its being injectable from the uterine vessels and not from the foetal proves that it is a uterine and not a foetal structure. The superficial lamella of decidua at the upper part has been turned down since the drawing was made, but the specimen was easily identified by the arrangement of certain vessels, such as the curling arteries at its left side. The turned down layer contains few vessels large enough to carry the injection, the deeper layer is crowded with vessels. The following description of the decidua is taken from the *Description of the Gravid Uterus*, p. 46. “This is a membrane of a very peculiar nature, the knowledge of which throws great light upon the contents of the pregnant uterus, and upon the connection between the mother and child. It is the outer membrane of the secundines, and yet it may be said to be the internal membrane of the uterus. It is much thicker and more opaque than the other membranes, yet still is of a much more tender texture, insomuch that it has scarcely a more firm consistence than a curd of milk or coagulum of blood. It is full of small arteries

and veins, often seen containing red blood, which ramify from its outer surface inwards through its substance; the principal arteries run in winding convolutions like the coilings of a snake. It is very thin, and commonly has no perceptible blood-vessels at that part which is situated near the cervix uteri; it grows thicker and more vascular towards the placenta, at the very edge of which it acquires a considerable thickness, and splitting into two strata, is continued over both surfaces of the placenta, but especially its inner smooth surface, blending itself there inseparably with the umbilical portion of the placenta. In what sense this membrane covers the outside, or constitutes the uterine portion of the placenta, has been already explained. (See No. 48.25.) The internal surface of the decidua, and its union with the chorion, was explained above in treating of that membrane. (See No. 48.93.) Its external surface, except what was opposite or near to the os uteri, is more or less unequal and ragged, and full of the broken ends of small arteries and veins which come into it from the uterus. Where it is pretty thick it is often divisible into two or more laminae. Its outer stratum or lamella is perforated at each fallopian tube, and at the os uteri." (See Nos. 48.176 and 48.177a, which show the arrangement of the decidua in the early months before coalescence of its two layers.) "This membrane is an efflorescence of the internal coat of the uterus itself, and is therefore shed as often as a woman bears a child or suffers a miscarriage. It is of considerable thickness and one stratum of it is always left upon the uterus after delivery, most of which dissolves and comes away with the lochia. Frequently a thicker stratum separates from the uterus in one part and a thinner in another; and sometimes, especially when the discharge of the secundines is hurried in a labour, the whole membranous parts, both of the decidua and chorion, and likewise its adhesion to the muscular fibres of the uterus, is rather stronger than the adhesion between its external and internal stratum, which we may presume is the reason that in labour it so commonly leaves a stratum upon the inside of the uterus." The decidua in this specimen is a fairly thin membrane; much thinner than in the early months, when it is still recognizable as hypertrophied uterine mucous membrane; but thicker and more opaque than it is by the end of pregnancy, as may be seen in No. 48.108. Compare Nos. 48.123, and the dissections Nos. 48.153 to 48.158.

48.107. The Decidua Injected from the Uterus.*Hunterian. RR. 102.*

“A part of the uterus injected black; the membranes (chorion and amnion) on the inside are detached in part; the amnion and chorion are not injected, but the decidua is, proving it to belong to the uterus.” Very similar to the preceding, which see.

48.108. Blood-vessels of the Decidua at Term.*Hunterian. RR. 109.*

A portion of the decidua from a labour at full time, prepared to show the above. It is mounted on a piece of white paper, on the back of which is written in William Hunter's handwriting. “From a secundine at the Hospital, before the matron and pupils July 11th, 1766.” (The British Lying-in Hospital, of which he was the chief physician.) The mode of preparation is as follows: “In order to see the genuine appearance of the decidua after a labour, the secundines should be instantly well washed in warm water, to remove the loose coagulated blood, and then put into cold water that the blood which remains in the vessels may congeal; and when the decidua happens to be well marked with blood-vessels, a piece of the membranes may be spread upon white paper and held near a strong fire till the blood changes to a blackish colour and dries. This prevents the transudation of the red blood, which would presently render the vascular structure of the decidua indistinct or invisible. The number and size of the vessels which pass from the uterus to the placenta, and which are necessarily broken through upon a separation of these two parts, sufficiently accounts for the bleeding which has always been known to happen upon such an occasion; and we cannot longer wonder that considerable and even fatal bleedings have happened from a separation merely of a part of the membranes.

“Though the decidua be allowed to be the outer membrane of the secundines, yet, as it is really the internal lamella of the uterus, we may still retain the old language, and say that the outer membrane of the ovum (that is of the contents of the uterus) is chorion, and that the chorion is in contact with and adheres to the uterus. Those anatomists who describe the human chorion as a transparent smooth membrane, without any blood-vessels are surely so far in the right, but when they apply that description to the outer membrane of the secundines, they betray

a total ignorance of their subject. They can never once have looked with attention upon the fresh human secundines." (*Description of the Gravid Uterus*, p. 40.)

William Hunter in the above passages plays upon the different meanings applied in his day to the word chorion. Previous to his demonstration of the true nature of the decidua—that it was the mucous membrane of the uterus modified to subserve the needs of gestation—there was a confusion between the outer foetal membrane, the villous chorion, then called true chorion, and the actual outer membrane which is shed in childbirth, then called spongy or false chorion, but by William Hunter decidua or caduca. And he said in his lectures, "We will now, gentlemen, for once try what new language will do. I will say there are three membranes, the 'amnion,' seen on the inside of these two commonly called 'true' and 'false' chorions, the internal of which now alone I call 'chorion,' and the external one of all 'decidua' or 'caduca,' which is a thick spongy and brittle membrane. This decidua, we shall see, is a layer of the uterus." (*Midwifery Lectures*, MS. R.C.S.Eng., 42, c. 31, p. 33). In this specimen the decidua had become very thin as it always is at term, and when dried on paper it appears no thicker nor more opaque than chorion or amnion. A proper conception of the decidua is only to be obtained by studying it at all stages, and with the aid of the microscope. Compare particularly the photomicrograph in No. 48.113a, and No. 48.176 which is a complete decidua and ovum at eight weeks.

48.108a. Microscopic Section of the Placenta in the Fifth Month, with enlarged Sketch. *J.H.T.* 1897.

Microscopic section of the edge of the placenta from specimen No. 49.65 (Series Pathological Conditions connected with Pregnancy), stained with haematoxylin and eosin and mounted in canada balsam. Along with it is placed an enlarged sketch indicating the different structures shown.

48.109. Decidua and Chorion. *Hunterian. RR.* 116.

"A portion of uterus, with two laminae turned down, the one of decidua, the other of chorion."

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48.110. The Decidua.*Hunterian. RR. 117.*

"A portion of uterus, including the cervix; showing five or six laminae of decidua, besides amnion and chorion." The specimen is from a uterus a considerable time before term. There is a considerable cavity between the decidua vera and the outside of the decidua reflexa opposite the os. Elsewhere their coalescence is complete. (Contrast No. 48.176.) The continuity of the decidua vera with the mucous membrane of the cervix is very distinct. The decidua is a quite thick opaque membrane. (Contrast No. 48.108.)

48.111. Decidua, Placenta, and Cervix at the Sixth Month.*Hunterian. RR. 122.*

"A section of the uterus about the sixth month; showing the placenta and membranes adhering; the different structure of the placenta from the uterus; but, especially, that the cervix uteri does not contain any part of the ovum, but is as narrow and contracted as in the unimpregnated uterus." (Compare Nos. 48.44 to 48.50.) The specimen also illustrates the thinning out of the decidua as pregnancy advances, and the coalescence of its two layers. From about the middle of the uterus the decidua reflexa has not yet united firmly with the decidua vera; it has been raised up, and appears as a thin opaque covering to the chorion. The passage of the vera into the mucous membrane of the cervix is very distinct and evident. A beautiful specimen.

48.112. The Decidua, Placenta, and Condition of the Cervix at the Sixth Month.*Hunterian. RR. 123.*

"A section of the same uterus, showing the same circumstances, together with the foetus attached to the placenta by the navel-string." A beautiful specimen.

48.113. The Decidua in the Fifth Month.*Hunterian. RR. 131.*

Posterior half of the "uterus of the eleventh subject, in the beginning of the fifth month." The remainder of this constitutes specimens Nos. 48.153 and 48.154. The arteries and veins are injected different colours. "On its inside the decidua appears an

opaque porous membrane, distinguishable from every other membrane of the body, and resembling somewhat a fine lace." A portion of this is figured in Plate XXIX. of William Hunter's plates of the *Gravid Uterus*, "considerably magnified," representing "the internal surface of a portion of the decidua, to show its peculiar cribriform or lace-like appearance." This is due to the presence in it of innumerable dilated uterine glands, which being torn across, appear as cup-like depressions in the surface of the layer of decidua which is here shown lining the interior of the uterus. It is also through this zone of dilated uterine glands that the normal separation of the decidua in parturition takes place, leaving the deeper stratum adhering to the uterus.

48.113a. Section of Decidua in the Eighth Week, with Photomicrograph. *J.H.T. 1897.*

Microscopic section of the decidua vera from an abortion in the eighth week, No. 48.177a. Showing its thickness at this early period, and the dilated uterine glands described in the preceding specimen. Stained with haematoxylin, and mounted in canada balsam. The photograph shows the relation of parts. The dilated glands occupy the deeper layers of the separated decidua giving it a spongy character, whereas the superficial layer is comparatively dense tissue.

48.114. Amnion, Chorion, and Decidua.

Hunterian. RR. 135.

A section of the uterus, with the above partly detached and hanging down. The decidua is fairly thin, showing that it was at a late period of its existence.

48.115. Amnion, Chorion, and Decidua.

Hunterian. RR. 136.

Similar to the preceding.

48.116. Amnion, Chorion, and Decidua.

Hunterian. RR. 137.

A similar preparation, the decidua injected red and split into two layers; the superficial contains fewer vessels than the deep one

48.117. The Amnion.*Hunterian. RR. 138.*

A foetus, "about the sixth month," enclosed in its amnion, which is large and roomy. Contrast next specimen. The amnion is described by William Hunter as follows: "This membrane is uniformly thin, transparent, and without any visible fibres or vessels, yet its texture is firm, so as to resist laceration much more than the other membranes. It lines all the inside of both placenta and membranes, and therefore forms the bag which immediately contains the child and its circumambient water. At the insertion of the navel-string into the placenta, the amnion is continued over the outside of the cord, and covers it all the way to its very beginning at the navel of the child; where, if the texture of the two parts were not so different, we might suppose the amnion and cuticle to be continued into one another. By its internal surface, which is smooth and glossy, it is everywhere in contact with the liquor amnii or child. Its outer surface adheres to the chorion by means of an intermediate transparent gelatinous substance, of which there is sometimes a pretty thick stratum. This connecting medium between the amnion and chorion appears to be neither fibrous nor vascular, and is so tender that the least force or rough handling separates these two membranes even in the most recent state of the secundines; and, if kept till putrefaction is begun, it is scarcely possible to prevent their separation." (*Description of the Gravid Uterus*, p. 44.)

48.118. The Amnion.*Hunterian. RR. 192.*

"A child enclosed in the amnion. About the sixth month." In this case the amnion clings close round the child, the smallness of the sac being in great contrast to its roominess in the preceding specimen.

48.119. Amnion, Chorion, and Decidua.*Hunterian. RR. 170.*

"A portion of the uterus, showing the membranes partly detached, and an ovarium larger than common, with a very large corpus luteum, having no cavity; one half of the corpus luteum is subdivided by a cut nearly through the whole of it." The decidua is not detached.

48.120. Amnion, Chorion, and Decidua.*Hunterian. RR. 173.*

A portion of the uterus, with the membranes partly detached: shows their condition at a late stage of gestation. The decidua is split into two layers which hang down over the upper part of the specimen. They are considerably thicker and more opaque than the chorion and amnion, which are seen hanging over the lower part of the specimen.

48.121. The Decidua.*Hunterian. RR. 171.*

A portion of the uterus, injected red and black, showing the decidua in an earlier stage, as a thick fleshy membrane containing numerous vessels.

48.122. The Decidua.*Hunterian. RR. 174.*

A portion of the uterus, showing the above in a condition intermediate between the two preceding. Injected coarsely green and red.

(C) THE MATURE PLACENTA.

**48.123. "A Whole Placenta, injected red and yellow, with a portion of the Membranes preserved."
The Decidua.***Hunterian. RR. 159.*

It is injected by the umbilical cord. The decidual covering (decidua serotina) of its outer surface is intact; it is not injected. "When a placenta is finely injected and then steeped, and frequently washed in clean water, it is evident that the umbilical injected vessels do not reach even the outer surface of the placenta, but are only seen through a membrane (decidua) which covers all that surface. It is rough and ragged, like the inner surface of the uterus to which it adheres, and by its whiteness becomes very distinct from the vascular injected part of the placenta over which it is spread. It becomes still more distinguishable when the part is put into spirits, which renders it more opaque and whiter. This membrane is an efflorescence or production of the inner membrane of the uterus, and it is analogous to the uterine fungi of quadrupeds. It receives no vessels, demonstrable by the finest

injection, from those of the navel-string, yet it is full of both large and small arteries and veins. These are all branches of the uterine vessels, and are readily filled by injecting the arteries and veins of the uterus; and they all break through in separating the placenta from the uterus, leaving corresponding orifices on the two parted surfaces.

“This decidua or uterine portion of the placenta is not a simple thin membrane expanded over the surface of the part. It produces a thousand irregular processes, which pervade the substance of the placenta, as deep as the chorion or inner surface, and are everywhere so blended and entangled with the ramifications of the umbilical system that no anatomist will perhaps be able to discover the nature of their union. While these two parts are combined, the placenta makes a pretty firm mass, no part of it is loose or floating; but when they are carefully separated, the umbilical system is evidently nothing but loose floating ramifications of the umbilical vessels (compare No. 48.127), like that vascular portion of the chorion which makes part of the placentula in a calf; and the uterine part is seen shooting out into innumerable floating processes and rugae, with the most irregular and most minutely subdivided cavities between them that can be conceived. This part answers to the uterine fungus of a quadruped.” (Compare 48.232 *et seq.*, Placentae of cow and sheep.) “In a placenta of nine months I have never been able to separate the two constituent parts otherwise than by some degree of putrefaction, and gentle rubbing and washing; but this operation always destroys the uterine portion, which is more tender and melts down by putrefaction sooner than the other. In the placenta of an earlier age, the union of the two constituent portions is less intimate, and they may both be preserved entire, like the vascular chorion and fungus in the quadruped. I did this operation in a conception of four months, and still preserve the uterine part of it attached to the inside of the uterus. I wished to give a figure of it; but the processes were so irregular and so changeable, while floating in the water, that the painter could not express them; and when taken out of the water they collapsed into a smooth membranous appearance.” (This specimen is not now in the Museum.) “These two portions of the placenta are so interwoven with one another as to leave innumerable small vacuities, with free communications through the whole substance. If this cellular structure be inflated or injected, the placenta, like the corpora cavernosa penis, acquires a very

considerable increase of thickness, and subsides again when the fluid escapes. This cellular receptacle in the placenta cannot be completely filled after it has been parted from the uterus, because then the fluid we may by any contrivance throw in will be discharged at innumerable orifices on the outer surface of the placenta; but while it remains attached to the uterus, all the cells may be easily and completely filled by injecting any fluid into the arteries or veins of the uterus. These vessels, and these only, have a demonstrable communication with the spongy cells of the placenta, which receive the maternal blood from the arteries of the uterus, and give it back into the veins of that part. Both these vessels pass in the decidua; and the larger branches of both with little or no ramification, terminate abruptly in the cells." (See, for foetal portion of the placenta, Nos. 48.126 to 48.134; for maternal (intervillous) blood spaces, Nos. 48.99, and 48.135 to 48.150; especially Nos. 48.135, 48.140, and 48.146; also dissections Nos. 48.153 to 48.158.)

48.124. The Placenta.

Hunterian. RR. 162.

"A placenta, the arteries injected of a lake colour, and the large branches of the vein white"; partly unravelled on the outer surface. The chorion has also been dissected away from part of its inner surface, exposing the spongy "cellular" substance in the cavities of which the maternal blood circulates.

48.125. The Placenta.

Hunterian. RR. 163.

"Placenta injected black; being partly unravelled, and the decidua partly adhering, giving it a motley appearance," only the foetal vessels being injected, and the decidua remaining white.

48.126. The Placenta, partly Unravelled, showing Foetal Blood-vessels.

Hunterian. RR. 165.

"A placenta injected black and red; and in some places there is no injection, from small lobules being tied by a ligature before the injection; the whole has a varied motley appearance." (For mode of preparation see under No. 48.84. Compare also No. 48.123.)

48.127. Placenta partly Unravelled, showing the Foetal Portion.*Hunterian. RR. 142.*

A placenta uninjected, unravelled by maceration and washing, as described under No. 48.123, showing the above. The foetal portion of the placenta does not consist solely of foetal vessels, as described under No. 48.123, but of hypertrophied chorionic villi with the blood-vessels inside them (see No. 48.134a.) Compare No. 48.158 *et seq.*, Development of the Placenta, etc.; and Comparative Anatomy of the Placenta, No. 48.229 *et seq.*

48.128. Placenta Unravelled. Foetal Portion.*Hunterian.*

A placenta injected red, macerated and unravelled. It is much more completely unravelled than the preceding, and shows a most beautiful "shag" of loose floating blood-vessels contained in the branching chorionic villi.

48.129. Placenta Unravelled. Foetal Vessels.*Hunterian. RR. 408.*

Similar to the preceding, but even more finely unravelled, showing beautiful long shaggy floating processes of chorionic villi bearing the foetal vessels. Injected red in parts. (Not described in the old catalogue.)

48.130. Placenta Unravelled. Foetal Portion.*Hunterian. RR. 160.*

A similar specimen, dried or "hardened in spirits of wine," and mounted in turpentine.

48.131. Placenta Unravelled. Foetal Portion.*Hunterian. RR. 164.*

"A placenta most entirely unravelled, injected brown and white; looking somewhat like dried grass."

48.132. Placenta Unravelled. Foetal Blood-vessels.*Hunterian.*

A portion of a placenta injected red; unravelled very completely right up to the insertion of the umbilical cord, showing the branching of the foetal vessels to a marvellous degree of fineness.

48.133. Placenta Unravelled. Foetal Portion.*Hunterian. RR. 194.*

A portion of a much younger placenta unravelled, showing the processes containing the foetal blood-vessels much more like the foetal villi shown in Nos. 48.158 *et seq.* than they appear in the more fully developed organ.

48.134. Placenta Unravelled. Foetal Portion.*Hunterian. RR. 195.*

Similar to the preceding, but a smaller portion.

48.134a. The Foetal Blood-vessels and Maternal Blood-sinuses of the Placenta.*J.H.T. 1898.*

A section of the placenta at eight months with photomicrograph, showing the chorionic villi with their blood-vessels distended with the blood of the foetus, and between them the intervillous spaces filled with maternal blood. Injected by Dr. Malcolm Black after the directions given by Dr. Thomas Watts Eden, *Journal Path. and Bact.*, Vol. iii., p. 457. The umbilical cord, after being tied in the ordinary way, was stripped back to the placenta so as to squeeze the blood into the vessels of the villi, then tied again close to its insertion, and the whole organ fixed in Muller's fluid.

48.135. Uterine Blood-vessels Traced into the Placenta.*Hunterian. RR. 126.*

"A section of uterus and placenta, not injected, where some vessels have been traced by bristles from the uterus into the placenta." The following quotation from William Hunter's *Description of the Gravid Uterus*, pp. 37-39, indicates the points illustrated by this and the succeeding twenty specimens: "Notwithstanding the disputes still subsisting among anatomists, whether any blood-vessels pass between the uterus and placenta, and though the texture of these vessels be so exceedingly tender that they break with the least force, they are as demonstrable, in a proper subject, as any vessel in the body, not only by injections, but in a fresh subject without any artificial preparation; and any anatomist who has once seen and understood them, can readily discover them on the surface of any fresh placenta. The veins, indeed,

he will find to have an indistinct appearance, from their tenderness and frequent anastomoses, so as to look a good deal like irregular interstitial void spaces (see Nos. 48.137–48.144); the arteries, which generally make a snake-like convolution or two on the surface of the placenta (see No. 48.153), and give off no anastomosing branches, are more distinct. The best time for seeing them is as soon as a placenta comes away in a common labour. Let its surface be instantly washed with clean water, that all the loose blood may be removed. This renders the ground (the decidua) lightly coloured, and for that reason makes the vessels, which will still contain some dark blood, more conspicuous.

“If a blow-pipe be thrust into the substance of the placenta anywhere, the air which is blown into the cellular (blood-cells) part opens and rushes out readily by the open mouths both of the arteries and the veins. While the placenta remains adhering to the uterus, any injection made by the uterine arteries fills not only these vessels but also the cellular part of the placenta; and if we continue the operation, the injection returns from these cells into the veins of the uterus and fills them likewise. The same thing happens, but in an inverted order, when we begin by injecting the veins of the uterus. Thence it is that in injecting the gravid uterus, if we fill one system of uterine vessels fully, we can hardly afterwards get the injection to run any length of way in the other system; therefore, when we wish to have both systems pretty well injected, we must fill the first only moderately, and then the other. And when the arteries and veins of the uterus have been filled in this manner with wax of different colours, we observe, in examining the placenta, that the wax which was thrown into the first system (the arteries for example) is driven towards the inside of the placenta by the wax which was last thrown by the other system, and which for that reason lodges itself principally in those cells of the placenta which are next to its outer surface. (See No. 48.148.) While the placenta and membranes adhere to the uterus, make a slit into the coat of the navel-string, there introduce a blunt probe, and force it into the cells (blood-cells) of the adjacent part of the placenta; then withdrawing the probe, insinuate an injecting pipe, and tie it firmly with a broad thread round the navel-string. You will then find that you can, by that pipe, fill the whole placenta uniformly in its cellular part, and likewise all the venous system of the uterus and decidua as readily and fully as if you had fixed the

pipe in the spermatic or hypogastric vein, so ready a passage is there reciprocally between the cells of the placenta and the uterine veins. It is as much reciprocal and much more largely open than between the corpus spongiosum and the veins of the penis.

“From all these experiments and observations, which have been often repeated and diligently attended to with no other desire than to discover truth, it seems incontestible that the human placenta, like that of the quadruped, is composed of two distinct parts, though blended together, viz., an umbilical, which may be considered as a part of the foetus, and an uterine, which belongs to the mother; that each of these parts has its peculiar system of arteries and veins, and its peculiar circulation, receiving blood by its arteries and returning it by its veins; that the circulation through these two parts of the placenta differs in the following manner: in the umbilical portion the arteries terminate in the veins by a continuity of canal, whereas in the uterine portion there are intermediate cells into which the arteries terminate, and from which the veins begin.

“Though the placenta be completely filled with any injection thrown into the uterine vessels, none of the wax finds its way into any of the umbilical vessels; and in the same manner fluids injected into the umbilical vessels never can be pushed into the uterine, except by rupture or transudation.

“The first time (in the year 1743) that I injected the vein of the navel-string while the placenta adhered to the uterus, in separating these two parts it was evident that the injection had nowhere passed further than the placenta, except at one place, where a small convoluted vessel (no doubt an artery) was traced, distinctly filled with wax, some little way into the substance of the uterus; but upon examination it was evident that there was extravasation in that part of the placenta, and by many trials I know that water, or any fluid fit for transudation, thrown into the umbilical arteries or veins, readily gets into the cellular cavities of the placenta, and thence into the vessels, especially the veins, of the uterus.”

The above passages give a beautifully accurate and clear account of the relationship between the foetal and the maternal circulations, and taking them along with those quoted under Nos. 48.83 and 48.123 of the anatomy of the placenta, so far as was possible in the state of science at the time they were written. The words “blood-cells” have been interpolated twice, because, though it is clear from the description and from the specimens that William

Hunter meant by "cells" and "cellular part" or "cellular structure," the intervillous maternal blood-spaces of the placenta, his latest editor, Rigby (1843), has very wrongly taken him to have meant the cellular or areolar tissue of the organ. The intervillous blood-spaces are also very well shown, filled with injection, in Nos. 48.140 and 48.148.

48.136. Uterine Blood-vessels Supplying the Placenta.

Hunterian. RR. 128.

"A section of the uterus, with its vessels injected black, which are very large and project upon the inside, where they were continued into the substance of the placenta." The arteries are comparatively small, but the veins very large. The injection mass has broken down and fallen out of the orifices to a considerable extent.

48.137. The Uterine Veins of the Placenta.

Hunterian. RR. 124.

"A small portion of the uterus and placenta, where the cells of the placenta have been injected from the veins of the uterus; the veins are seen very large, entering into the substance of the placenta: injection green."

48.138. The Uterine Veins of the Placenta.

Hunterian. RR. 124a.

Similar to the preceding.

48.139. The Uterine Veins of the Placenta.

Hunterian. RR. 125.

"Another portion of the same, showing the cells of the placenta injected from the uterine veins, and especially two corresponding veins, which were passing from the uterus to the placenta and ruptured by the placenta being detached."

48.140. The Maternal Blood-spaces of the Placenta. "Placental Cells."

Hunterian. RR. 140a.

A portion of the placenta injected red by the umbilical vessels,

and the chorion torn from the inside. The foetal vessels filled with the vermilion injection are seen branching most beautifully on the outer (placental) surface of the chorion and in the mass of the placenta. Also shows the intervillous spaces (maternal blood-cells) as "innumerable small vacuities, with free communications through the whole substance," as described under specimen No. 48.123. Compare also Nos. 48.135 and 48.134a.

48.141. Maternal Blood-spaces (Intervillous Spaces or "Cells") of the Placenta. *Hunterian. RR. 179.*

"A very small portion of the placenta and membranes; the cells injected red, and some vessels from the uterus seen behind, passing towards the placenta." It seems to be a mass of red injection which has a granular appearance from being broken up by innumerable processes of foetal tissue. "The wax was everywhere manifestly granulated; so that it had plainly filled natural cavities; for if it had filled the substance of the placenta by common extravasation it would have formed itself into irregular and large masses." (Description of Pl. X., fig. 2, in Hunter's *Gravid Uterus*.)

48.142. Uterine Veins Entering the Placenta.

Hunterian. RR. 178.

"A section of uterus, with the veins injected green, and broken off where they were entering into the placenta."

48.143. Uterine Veins Entering the Placenta.

Hunterian. RR. 144.

"A portion of the placenta injected black (from the umbilical cord); some veins may be seen injected green (from the uterus) which are entering into the substance of the placenta."

48.144. Uterine Veins Entering the Placenta.

Hunterian. RR. —.

(Not numbered or described.) A portion of the uterus and placenta injected green from the uterine vessels. The placenta is partly separated from the uterine wall, and in the angle are seen the "corresponding orifices (of the torn veins) on the parted surfaces." See under No. 48.85.

48.144a. The Uterine Blood-vessels and the Intervillous Spaces of the Placenta. *Hunterian. RR. 146.*

"A portion of the uterus with placenta adhering, injected red: the cells of the placenta are injected from the uterus." The red injection is seen in the blood-vessels of the uterus as well as in the "cells of the placenta" or intervillous spaces. There is not a trace of it in the umbilical cord. Compare succeeding specimen.

48.145. The Intervillous Spaces of the Placenta.

Hunterian. RR. 147.

A portion of the placenta injected red from the uterine vessels, "the cells filled apparently with fine injection of a red colour; less distinct than when coarse injection is employed; the vessels of the navel-string are quite empty, although the injection of the cells had been very minute, proving no communication."

48.146. The Blood-spaces of the Placenta.

Hunterian. RR. 147a.

Another portion of the same.

48.147. The Blood-spaces of the Placenta.

Hunterian. RR. 151.

A similar specimen with the maternal blood-spaces (intervillous spaces) filled with black and red injection from the uterine vessels. The foetal vessels are seen empty through the transparent amnion and chorionic membrane. The injection being coarse, comparatively few vessels of the decidua have been penetrated by it.

48.148. The Thickness of the Placenta after Injection of the Maternal Blood-spaces. *Hunterian. RR. 167.*

A similar but larger specimen, which appears to be that from which fig. 2 of Pl. XXIV. of Hunter's *Gravid Uterus* was taken. The following passages are quoted from the description of the plate: "A section of half of the placenta principally to show what thickness it had acquired by its spongy cavities being filled with wax." The edge of the placenta is "thickened and rounded by the injected wax." "Most of the blue wax, which was first injected by the veins of the womb, was driven on towards the internal surface, and the red wax which was afterwards injected by the arteries was

lodged principally in the outer parts; but the two colours were, more or less, blended through the whole." This describes the specimen exactly, with the one exception that the injection from the veins is black; this, however, may be the result of changes due to the time which has elapsed since the specimen was made; it has been observed elsewhere in the collection. The white markings where the uninjected foetal blood-vessels appear among the injection in the cells, correspond exactly with those in the plate.

48.149. The Blood-spaces of the Placenta.

Hunterian. RR. 167a.

Another portion of the same, the spaces injected black and red.

48.150. The Blood-spaces of the Placenta.

Hunterian. RR. 169.

"A portion of the uterus with the placenta adhering; the vessels of the uterus injected black and red: the cells of the placenta are filled with a different injection, and therefore not from the vessels of the uterus, but must have been previously filled from the spongy substance of the placenta itself." See No. 48.135.

48.151. The Uterine Veins Overlying the Placenta.

Hunterian. RR. 183.

"A longitudinal narrow section of an uterus with the placenta adhering." The veins supplying it, filled with a yellowish injection, are very large and numerous.

48.152. The Uterine Veins Overlying the Placenta.

Hunterian. RR. 184.

Similar to the preceding.

(D) DISSECTIONS OF THE GRAVID UTERUS.

48.153. The Anterior Half of the Uterus and Vagina, "from the Eleventh Subject in the beginning of the Fifth Month." Showing the Arteries and Veins of the Placenta.

Hunterian. RR. 180.

This specimen is part of the one used in the preparation of

Pls. XXVII. and XXVIII. of William Hunter's *Gravid Uterus*. It corresponds with the last stage of dissection, which is shown in fig. 2 of Pl. XXVIII. Parts of it are described under the earlier figures, and therefore the quotations are partly taken from the descriptions of those figures. The whole posterior half of the womb and vagina is removed, showing, (1) the nymphae, orifice of the urethra, "the lower end of the vagina which is rugous, and the upper end which is smooth especially behind, and the orifice of the womb, projecting into the upper end of the vagina" (XXVII. 1). (2) The state of "the inside of the neck and orifice of the womb" (XXVII. 2), which is neither shortened nor dilated, but is considerably increased in girth. Above this "it was evident that the decidua was not, like the other membranes, extended across the passage in the neck of the womb, but was continued a little way down that passage, and there insensibly lost or blended with the glutinous cement" (XXVIII. 1). By "glutinous cement" was meant the plug of mucus which so commonly occupies the cavity of the cervix; it has now disappeared revealing "the rugous inside of the neck of the womb" (XXVII. 2), and the decidua blending with the mucous membrane lining it. (3) "The circular surface at the fore part of the womb, to which the placenta, in this case, adhered. It was full of arteries and veins, which had passed between the womb and the placenta, and which we broke through in separating these two parts; the arteries were small and convoluted and of a lighter colour; the broken veins had the appearance of dark spots or holes, of some considerable size." The arteries are injected red; the veins black. They are very distinct. (4) "The irregular line, which surrounds this rough surface to which the placenta adhered, points out the extreme border of the placenta, which was cut off from the membranes, and where the inner layer of the decidua, all round, was reflected upon the outer surface of the chorion" (XXVIII. 2). (5) "The ovarium and corpus luteum cut through; the latter of these even at this time had an apparent cavity" (XXIX. 3). For the posterior half of this uterus, see No. 48.113; and for the ovum removed from it see No. 48.154.

48.154. "Ovum in the beginning of the Fifth Month."

Hunterian. RR. 181.

The ovum from the same case as the preceding; figured in William Hunter's *Gravid Uterus*, Pl. XXVIII., fig. 2, and Pl. XXIX., fig. 1, and described as follows:

"The ovum taken out of the womb, showing the external surface of the placenta, and the ragged edge all round where the decidua reflexa was torn through. This figure corresponds with the second figure of the preceding plate (specimen No. 48.153) showing the surface of the ovum which was attached to the inside of that womb.

"*AAAA*. The decidua reflexa going off, all round, from the edge of the placenta, to cover the chorion.

"*BBB*. The edge formed all round the brim or border of the placenta, by cutting the decidua reflexa where it came off from the decidua, or in other words, from the inside of the womb. The round surface enclosed by that edge is the outer surface of the placenta, which had adhered to the womb. In separating those two parts many arteries and veins were torn through, one part of each remaining with the womb, the other with the placenta. The arteries, as in the preceding figure, are small convoluted, and of a lighter colour (injected red) as at the letters *CCC*; the veins make broad dark spots (injected black) as at the letter *D*."

The structures indicated by letters in the plate are readily identified by their colours and positions in the specimen. It also shows, as described under Pl. XXVII., fig. 2, "the decidua reflexa, covering the transparent membranes, in white and opaque striae. It was become so thin by extension as to be rendered almost transparent in many places. It had not as yet contracted an adhesion with the decidua which covered it." Much of the injection mass has fallen out of the intervillous blood spaces of the placenta, showing most beautifully its spongy texture. The foetus, quite uninjected, is seen through the transparent membranes, with a coil of the umbilical cord round its neck. The specimen is hung by means of a small fine sponge, which having been introduced through a comparatively small hole into the cavity of the amnion, has expanded so as to afford a broad support to the fine membranes, which would have torn had the silk been attached to them directly.

48.155. Uterus and Ovum "in the Fourth Month."

Hunterian. RR. 182.

William Hunter's *Gravid Uterus*, Pl. XXX. and Pl. XXXI. The one face of the specimen shows what is figured as Pl. XXX., and described as follows: "From the twelfth subject, in the fourth

month; shows the injected womb opened on its fore part, to give a full view of the external surface of the placenta, with the vessels passing into it from the womb. It shows likewise the state of the cervix externally and its relation to the bladder and urethra." (The lowest part of the bladder and the urethra are now cut away from a little below the orifices of the ureters). The surface of the placenta is similar to that seen in the preceding specimen. The other face shows the view given in fig. 2 of Pl. XXXI., after the back of the womb and decidua had been removed, "to show the foetus, in the liquor amnii, through the transparent membranes. The decidua reflexa in this subject was so thin that it was scarcely perceptible except near the edge of the placenta. The foetus, with the navel-string round its legs, requires no explanation." Figure 3 of the same plate shows the corpus luteum which is seen in the right ovary; it has a considerable cavity. The drawing having been copied directly on to the copperplate, the sides are reversed in the print.

48.156. Longitudinal Section of Uterus, Placenta, and Membranes "at Full Three Months."

Hunterian. RR. 189.

The specimen figured in William Hunter's *Gravid Uterus*, Pl. XXXII., fig. 2. "From the thirteenth subject, at full three months. A longitudinal section of the womb, placenta, and membranes, with the child near it, but still attached by the navel-string." The description and line diagram are copied entire; Pl. IV.

AA. The inside of the vagina. *BB.* The os uteri cut through. *CC.* The cervix uteri cut through.

DE. The passage through the cervix; in the posterior part of which, *E*, the pennatiform rugae are conspicuous.

FFFF. The section of the fundus uteri, in which the conception was lodged.

GG. The section of the placenta, which adhered backwards, where this womb was remarkably thick.

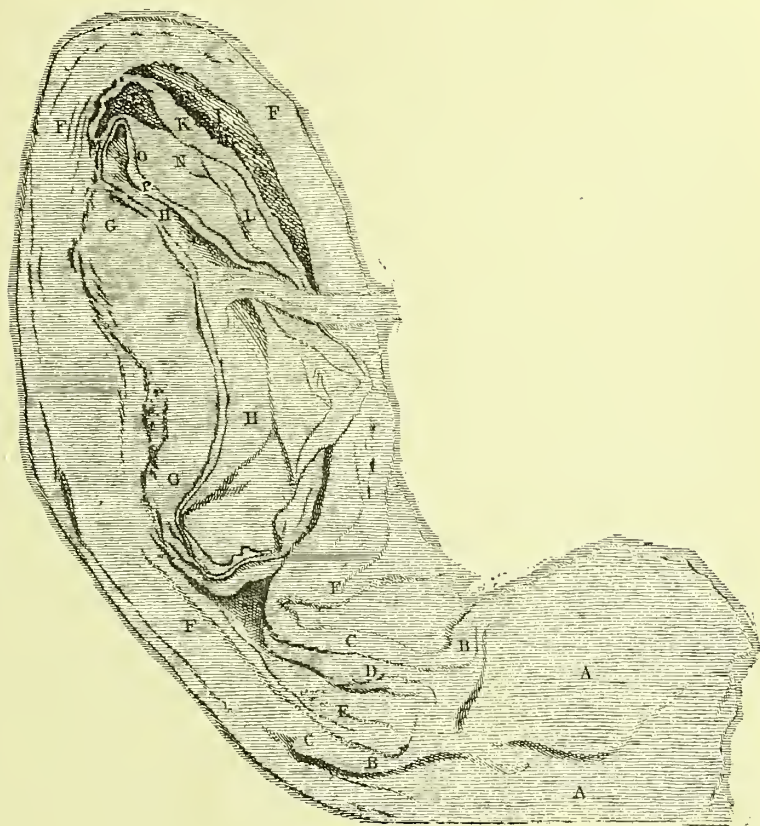
HH. The internal surface of the placenta, covered with the amnion and chorion.

I. Part of the inner surface of the womb.

K. A small part of the decidua separated from that inside of the womb.

LL. The internal surface of the decidua, or the cavity between the decidua and the decidua reflexa.

M. The angle near the edge of the placenta, where the inner



layer of the decidua is turned over the chorion to form the decidua reflexa.

N. The outside of the decidua reflexa, or the cavity between that membrane and the decidua.

O. The cut edges of the decidua reflexa and the chorion, which are intimately connected. P. The cut edge of the amnion."

48. 157. Longitudinal Section of Uterus, Placenta, and Membranes "at Full Three Months."

Hunterian. RR. 190.

Other half of the preceding.

48.158. Uterus in the Fifth Month Opened, showing the Membranes and the Enclosed Foetus.

Hunterian. RR. 193.

This specimen forms the subject of fig. 4, Pl. XXVI. of William Hunter's *Gravid Uterus*. It consists of the uterus and appendages "from the tenth subject, in the 5th month." It is finely injected red. The patient died from the effects of retroversion of the uterus, the circumstances of which are represented in the other figures of the plate. The recognition and description of this condition was one of the most fruitful of Hunter's discoveries in the way of saving lives. The specimen shows "the os uteri turned upwards. All around it is seen the inside of the adjacent parts of the vagina." The os is a small transverse slit. A portion of the muscular wall of the uterus, and most of the corresponding part of the decidua, has been cut out, leaving, as it were, a window filled by the transparent chorion and amnion, through which is seen the foetus lying on its back upon the inside of the fundus uteri. At the lower right hand corner of the preparation is seen "the external surface of part of the decidua. This membrane was thick and opaque, and full of small arteries, which were injected from the womb. The white loose lines on the chorion are the remains of the filamentous vessels which pass from it into the decidua"—the remains of the villi of the chorion; compare succeeding specimens.

This preparation is shown in the painting by Sir Joshua Reynolds in the picture gallery of the museum, which is the best known portrait of William Hunter.

SECTION III.

DEVELOPMENT OF THE HUMAN OVUM, SHOWING THE CHANGES IN THE VILLI OF THE CHORION, THE FORMATION OF THE PLACENTA, ARRANGEMENT OF THE DECIDUA, AND DEVELOPMENT AND GROWTH OF THE EMBRYO FROM ABOUT THE THIRD WEEK AFTER CONCEPTION.

(a) Development of the Foetal Membranes, Decidua, and Placenta.

48.159. Human Ovum, probably in the Third Week.

Hunterian. RR. 198.

"An ovum, very young, perhaps two weeks." The specimen is

everywhere covered with the shaggy villi of the chorion. At one point these are noticeably less developed than elsewhere; here is seen the little chorionic vesicle enclosing the amnion and embryo (not themselves visible). It is about 6 mm. in diameter, and unopened. The whole ovum is about 1 cm. in diameter.

48.160. Very Young Human Ovum and Decidua.

Dr. Mackenzie. 1835.

The label on the jar states that "this specimen was examined by Sir T. Wharton Jones, and by him described in *Philosophical Transactions* for 1837, p. 341." The following is his account of it:

"In the spring of 1836 I examined a small human ovum sent to me to Cork, where I then was, from Glasgow, by Dr. Mackenzie. In his letter to me, dated November 29, 1835, he describes it thus: 'A very small human ovum. It came along with the entire decidua from a patient of mine. It lay in the middle of one of the parietes of the decidua, rather near its upper edge, and was about the size of a marrowfat pea, before being put into spirits. The decidua covering it, towards the hydroperionic cavity,¹ was thin and semi-transparent, but the opposite portion of the decidual nidamentum was thick and marked with foramina, as if from vessels which had adhered to it, (really the cavities of dilated uterine glands). 'Having opened the nidamentum and taken out the ovum, I observed what will immediately strike you, that one side of it was bald and the other shaggy with the villi of the chorion. The bald part lay towards the hydroperionic cavity. A small puncture was made through the chorion, and perhaps through the amnion, by which some fluid escaped; nothing more was attempted. The Fallopian portions of the decidua measured nearly half an inch, and were both entire.'" In a subsequent letter Dr. Mackenzie says, in reference to the age of this ovum, "the ovum in question, I consider, as three or four weeks old. The lady had missed one menstrual period, and thought herself four weeks gone."

Sir T. Wharton Jones continues: "On laying open the ovum, by carefully cutting and reversing the bald side of the chorion, the following appearances (delineated, natural size, in fig. 7) presented themselves. The whole cavity of the chorion was filled with a fine gelatinous cellular tissue, embedded in which, towards one extremity

¹ Hydroperionic cavity is a term formerly used to denote the cavity of the decidua vera.

of the ovum, was a small round body." This he thought to be the ovum.

From examination of the specimen it appears that the decidua reflexa had completely enclosed the ovum, and that it was opened and the ovum shelled out. Of the prolongations of the decidua into the Fallopian tubes only one remains; a bristle was easily passed in through what was clearly recognizable as the natural calibre of the tube in the long one, and brought out by the other. The characteristic triangular shape of the decidua, corresponding to the shape of the cavity of the uterus, is quite evident even now. What Sir T. Wharton Jones opened and figured was the chorion. Of the round body supposed to have been the ovum nothing now remains. The whole chorionic vesicle, which lay on the bottom of the jar and is somewhat torn, measured 5 mm. in diameter; the plate shows the supposed ovum a little over 1 mm. The conception must have been much younger than Dr. Mackenzie imagined. The chorionic villi are matted together. This, and their aggregation on the side next the decidua serotina, seem to indicate that the placenta was already beginning to form. Microscopic examination of a small portion cut from the villous part, shows the chorionic membrane with a good deal of loose fibrous tissue on its inner side, and a number of small well formed (and fairly well preserved) villi cut in different directions on the other; also one or two of what seem to be decidual cells at the tip of one of these. There is no tissue between the epithelium covered edges of the villi. The chorion is hung from the lower edge of the decidua.

48.161. Human Ovum, probably about Three Weeks Old.

Hunterian. RR. 199.

Similar to No. 159, but a little larger, laid open. The outside is shaggy with villi. Over one area they are matted together by portions of decidua in which their ends were embedded. The placental area was even at this early age distinctly differentiated from the rest of the surface of the chorion by the greater development of the villi. There is no trace of the embryo.

48.162. Human Ovum, probably about Three Weeks Old.

Hunterian. RR. 201.

Similar to No. 48.159, but slightly larger. On one side the villi are less marked than on the other, which would probably have become the placental area.

48.163. Human Ovum, probably in the Fourth Week.*Hunterian. RR. 204.*

A considerably larger ovum, perhaps a month old, where the chorionic vesicle is seen among the villi fully 15 mm. in diameter; the chorionic villi largely developed on one side where the placenta was going to form, and atrophied to a considerable extent on the other side.

48.164. Human Ovum, probably in the Fourth Week.*Hunterian. RR. 206.*

A somewhat smaller ovum, on which there are comparatively few villi, and most of them are aggregated into a mass like the beginning of the placenta. On the rest of the sac they are very few indeed.

48.165. Human Ovum and Embryo, probably in the Fourth Week.*Hunterian. RR. 290.*

"An ovum at a very early period; showing the foetus in amnio and a very large vesicula umbilicalis." The cavity of the chorion is nearly 15 mm. in diameter. The amnion is very much smaller, and fits closely round the embryo, which measures 6 mm. in its greatest length along a straight line; it is very much curved, the head and tail being strongly flexed towards the ventral surface. Three of the branchial clefts can be made out. The limbs are little formless buds projecting from the sides of the body towards the front. The embryo is attached to the chorion by a very short thick stalk, which rises from its abdomen between the hind limbs but further from the tail end of the body than they. The umbilical vesicle is about half the size of the embryo and lies close to it, attached by a slender pedicle to the middle of the stalk. The chorion, as usual, is covered with villi, which are somewhat matted together where the placenta is going to be formed. The centre of this developing placenta corresponds with the point of attachment of the embryo. The allantois is not recognizable. Compare Nos. 48.197 and 48.198—"Vesicula Alba." A magnifying glass is necessary for the satisfactory examination of the specimen.

48.166. Human Ovum and Embryo "about a Month Old."*Hunterian. RR. 207.*

A similar specimen, but considerably larger, the cavity of the

chorion fully 2.5 cm. in diameter. There are comparatively few villi on its exterior, and these are much less aggregated than in the preceding. The principal mass of them is at some little distance from the embryo, and no connection between it and the embryo is visible. The embryo is larger than in the preceding, and more advanced, the branchial clefts being hardly recognizable. The mouth is better formed. The eye is a white spot on the side of the head towards the front. The old catalogue says: "an ovum laid open where a foetus may be seen; it is an oblong body, enlarged at one extremity where the head is, which is at this period much larger than afterwards in proportion to the bulk of the body; and there is scarce any appearance of the upper and lower extremities; there is as yet no appearance of navel-string, the ovum being about a month old, but the child adheres closely to the membranes; there is a considerable bag seen adhering to the chorion called vesicula umbilicalis, which towards full time degenerates into a white opaque spot or disappears entirely." Compare Nos. 48.197 and 48.198.

48.167. Human Ovum and Embryo of "about Six Weeks."

Hunterian. RR. 208.

"Ditto, further advanced, perhaps about six weeks." The specimen appears to correspond with fig. 6 of Pl. XXXIII. of the *Gravid Uterus* (hung upside down as regards the figure) where it is described as "an abortion of about eight weeks." The embryo is considerably larger than in the preceding. The front of the neck has given way, destroying the anteflexion of the head, which has clearly been present. Apparently it must have measured in a straight line from the neck bend to the hinder end of the body about 13 mm. The thorax and abdomen are closed, but the anterior parietes are so thin and transparent that the outlines of the heart and liver appear quite clearly through them. At the sides there seem to be faint indications of the branchial clefts—the tearing interferes with a proper estimate of their condition. The buds of the limbs with the rudiments of the fingers and toes are quite distinct. The lamina of the chorion hanging down shows few villi, but the other part, to which the embryo is attached by a well defined umbilical cord about 5 mm. in length, is thickly covered by them; and parts of the mass form a solid structure, clearly the beginning of the

placenta. The head and body form two ovals of nearly equal size. The umbilical vesicle, a small white spot, is seen at the right-hand edge of the lower flap of the chorion, connected with the insertion of the cord on the placenta by a fine white thread—the remains of its duct.

48.168. Human Ovum, probably in the Sixth Week.

Presented by Dr. Service of Dennistoun, 1897.

The specimen as presented was a beautiful little abortion, consisting of the chorion and its contents quite entire. As it lay in water it was of a circular disc shape, 4 cm. in diameter, and about 1 cm. thick. It was covered all over with villi, which were much more developed over the area to which the embryo was attached—the placental area. Through the less villous side the embryo was indistinctly visible. The history as received from Dr. Service was as follows: "July 28, 1897; Mrs. W. Last period 3rd June, 1897. Came from Portrush to Glasgow on 25th July, and was very sick on voyage. On 26th severe uterine contractions set in, and on the 28th, at 7 a.m., the conception came away entire. Thus, dating conception from 10th June, the age of the foetus would be 47 days." After hardening in spirit one side of the chorion was carefully removed. The amnion occupies only a small part of the cavity of the chorion; the rest was occupied by fluid and a very delicate, almost invisible, fibrous tissue. The amnion measures only 12 mm. in breadth. It is clearly separated from the contained embryo all round by a narrow space. The embryo is curled up with the head flexed forward almost in contact with the breast. The back of the head is nearly straight, with, if anything, a slight concavity at the level of the mandibular processes. At the beginning of the neck the embryo takes a sharp bend, almost to the extent of a right angle, and the back below this point is continued in an even convex curve. The length, in a straight line from the angle of the neck to the end of the body, is 10 mm.; measuring from the front of the head round the convexity of the back to the tip of the tail it is about 20 mm. The eye, maxillary, and mandibular processes, and at least the first of the branchial arches, and the heart shining through the thin walls of the thorax, are clearly distinguishable with the naked eye. In the brain the constrictions dividing it into three vesicles are quite recognizable. The digits are not

distinguishable on the ends of the limb buds. The lower end of the vertebral column sticks out as a pronounced tail, the point of which almost touches the head. The umbilical vesicle, measuring about 4 mm. in diameter, lies opposite the back of the neck of the embryo. Though the history allows a possible age of 47 days, comparison of the embryo with accounts of embryos of known age seems to point to its being rather between 30 and 35 days old." (MS. Notes, J.H.T., p. 153.)

48.169. Human Ovum about Eight Weeks Old.

Hunterian. RR. 213.

A beautiful specimen of the above, formerly described as "about six weeks," the chorion laid open, showing the embryo, which is about 17 mm. long in the straight line from the back of the head to the end of the body, enclosed in the amnion which is large and roomy. The embryo, though not much longer, is much stouter than that in the preceding. There is much less flexion of the cephalic end; the head is better formed; the branchial clefts are not recognizable, except the first, which forms the ear; and the digits are distinct. On the outside of the amnion lies the umbilical vesicle, attached to the umbilical cord by a thin pedicle about 8 mm. long. The cavity of the chorion is much larger than the amnion. On the outside the villi are seen, some floating free, others agglutinated by decidua into a thin flat round disc about 4 cm. in diameter.

**48.170. Human Ovum and Embryo in the Tenth Week.
Extrauterine.**

Hunterian. RR. 291.

Formerly described as "an ovum about six weeks; extrauterine, see No. 367" (now No. 49.2). "The foetus was found in a coagulum, and is preserved in a bottle marked RR. 291." It is a beautiful specimen of the human ovum, probably, from its state of development, considerably older than is stated in the old catalogue. The specimen consists of part of the membranes and the embryo mounted on a blue card. The portion of the chorion which was taking part in the formation of the placenta is on the right hand of the specimen. It is lined by the amnion. The other portion, spread out to the left, is almost devoid of villi. On it, lying between the amnion and the chorion, is seen the umbilical vesicle with its pedicle, a very distinct white thread, passing to

the insertion of the umbilical cord on the placenta. In the centre the foetus hangs by fully 1 cm. of well formed umbilical cord. It is 2 cm. long; the head and body are about equal in size, the cavities of thorax and abdomen completely closed, the mouth and external ears well formed, and the eyes on the front of the head. The limbs are free from the body quite to the middle of the thighs and upper arms, the thumb distinct from the fingers, and all the joints of the fingers distinguishable. There are two or three coils of intestine in the beginning of the umbilical cord, on the side of one of which the thread-like pedicle of the umbilical vesicle appears to terminate. This specimen is (so far as can now be ascertained) that which appears as fig. 124 in Quain's *Anatomy*, tenth edition, section Embryology, where it is described after Allen Thomson as an embryo in the tenth week. The figure first appeared in the seventh edition, Vol. II., fig. 603*a*.

48.171. Human Ovum. Villi of the Chorion.

Hunterian. RR. 209.

An ovum, unopened, of much larger size than the preceding, but in a different condition of development. The chorion is much more sparsely covered with villi, which are unusually fine and thread-like. They are much more numerous over one area than over the rest. The embryo cannot be detected. Possibly it was absent and there was a degree of atrophy of the villi, which would account for their fineness.

48.172. Human Ovum. Changes in the Chorion.

Hunterian. RR. 210.

A considerably larger ovum, unopened, with a foetus of fully 2 cm. length inside it, showing the chorion almost smooth on one side from atrophy of the villi, while on the other they are hypertrophied to take their part in the formation of the placenta. A piece of decidua is attached by the tips of the villi to the outside of the chorion.

48.173. Human Ovum about Ten Weeks Old. Formation of the Placenta.

Hunterian. RR. 211.

The conception is similar to the preceding in size, measuring 5 cm. in diameter, but the placenta is more developed and the

villi of the rest of the chorion more atrophied. The foetus is indistinctly visible through the smooth part of the chorion. It is about the same size as that in No. 48.170, but appears to be rather more advanced in its development.

48.174. Human Ovum of Fully Three Months.

Hunterian. RR. 252.

“An ovum, considerably advanced ; with decidua almost entirely removed, discovering the shaggy vessels of the chorion ; the child not remaining, but there is hanging down a considerable portion of navel-string.”

48.175. Human Ovum and Decidua. *Hunterian. RR. 229.*

A human ovum, said to be “about six weeks old,” with the decidua. The specimen shows the thick fleshy bag of the decidua vera laid open and turned aside, revealing the globular projection of the decidua reflexa enclosing the ovum. Part of the decidua reflexa has been removed to show the chorion, partly smooth, partly villous.

48.176. Decidua and Ovum of about Eight Weeks.

Hunterian. RR. 214.

A miscarriage, in which the decidua has come away almost entire along with the enclosed ovum, dissected to illustrate the anatomy of the decidua, its different layers, and their relation to the ovum during the early months of gestation. The decidua (decidua vera) is opened by crucial incision, showing the cavity between it and the decidua reflexa—the cavity of the uterus or cavity of the decidua. Bristles are passed in by two holes at the upper corners, corresponding to the orifices of the Fallopian tubes, and out by the orifice at the lower angle, corresponding to the internal os uteri. A round part of the decidua reflexa and a smaller area of the chorion have been cut out, showing the villous chorion and the cavity of the amnion. The angle where the decidua reflexa turns up over the chorion is well exhibited. Behind at the upper part is seen the decidua serotina with the tips of villi projecting through it, where the placenta was in process of formation. The specimen illustrates the nature of the decidua, the relations of its different layers to one another and to the ovum

in the earlier months of utero-gestation, first discovered and described by William Hunter. It is identical with the specimen from which figs. 5 and 6 of Pl. XXXIV. of his *Gravid Uterus* was taken, except in the one respect, that the ovum here is of considerable size, whereas in the original of the figure it is very small, like that in No. 48.160. It shows, "a bristle passed into the cavity of the conception, through a hole at each of the upper angles, which was supposed to be the termination of the Fallopian tube"; and "the same bristles coming out through a larger hole at the lower angle, supposed to be opposite to the cervix uteri." "It plainly appears that the decidua, in this case, was a thick membrane (of a gelatinous texture) which had lined and adhered to the whole triangular cavity of the fundus uteri; that the tubes terminated on its internal surface; that the chorion was lodged in its duplicature, or was surrounded with its substance; and that in proportion as the chorion would have been extended, in the progress of gestation, it would have encroached upon the cavity, stretching its interior lamella (or decidua reflexa), till at length the cavity being obliterated, the interior lamella would have come into contact with the inside of the decidua." In his *Midwifery Lectures* (MS. R.C.S.Eng., 42, c. 31, p. 69) describing the condition of the decidua in abortions in the early months of utero-gestation, William Hunter concludes as follows: "Now then, gentlemen, as this is such a fleshy opaque membrane, the only question that remains is this, viz., whether it is the external involucrem of the ovum or the internal membrane of the uterus. If it is the external involucrem of the ovum it certainly has vessels from the uterus, because we always inject it from the uterus, and this looks as if it was the internal lamella of the uterus. If it was the outer covering of the foetus, the Fallopian tubes and os tincae would both come only to the outside; but as it is the reverse, and they lead to the inside, from this and its being vascular from the uterus, it is very plainly the internal membrane of the uterus. Every time a woman conceives, and every time she throws off that conception, this membrane exfoliates from the uterus; it falls off as stag's horns or bird's feathers when they are shed. This is a very extraordinary membrane which there never was before an idea of."

48.177. Decidua and Ovum of about Eight Weeks.

Hunterian. RR. 243.

Similar to the preceding but with almost the whole of the

decidua vera torn away, and a large part of the reflexa and chorion and amnion cut out, showing the cavity of the amnion. The incisions have been made obliquely so as to bring into view the different layers of the membranes. The embryo is absent, but the umbilical cord and vesicle can be seen.

48.177a. Decidua and Ovum of about Eight Weeks.

Presented by Dr. Service of Dennistoun, 1897.

The specimen, as received from Dr. Service, consisted of the entire abortion covered with blood clots, exactly as it was passed. The history of the case was as follows: "Age not known. Miscarriage due to a shock. No disease, but patient weakened by frequent child-bearing, and much worried and unhappy." The decidua was entire except for a rent on the surface now treated as posterior, which led into the cavity of the decidua reflexa, and a small hole near one of the Fallopian tubes through which the embryo had been squeezed out. The embryo hung by the umbilical cord; its body had been torn open and its head off in the labour; it was replaced in the amnionic cavity. The decidua presented the customary triangular shape, almost equilateral. It measured 7 cm. on each side, and about 2 cm. in thickness as it lay in a flat dish of water. The three orifices (os uteri internum and Fallopian tubes) were easily recognized, and bristles were passed without difficulty between the orifices of the two tubes, and between each tube and the os. After hardening in spirit, the decidua was opened along one side, all the blood clot inside it removed, and the relations of parts carefully determined without displacing the bristles; the cut was afterwards sewn up with the edges in accurate apposition. A triangular piece was next cut out of the front (non-placental) side of the decidua, revealing the sac of the decidua vera as a rounded bag filling nearly the whole cavity of the decidua. Nearly the whole of the front of the decidua reflexa was next cut out. It then appeared that the amnion and chorion occupied only about one half of its cavity (the full extent of the amnion is shown in the specimen), the rest being a space of considerable size (at that time filled with blood clot) with which the above-mentioned rent communicated. The cavity of the amnion and chorion was very small, and the decidua reflexa over the front and upper parts of these membranes very thin, which accounts for their rupture and the extrusion of the embryo.

The placenta, with the umbilical cord rising from the centre of it, is seen on the back layer of the decidua. Microscopically it appeared well developed and perfectly healthy. The decidua reflexa, chorion, and amnion are separated from one another at the upper right hand corner of the ovum. The bristles are left *in situ*, showing that the cavity of the decidua is the cavity of the uterus and that the os uteri and the Fallopian tubes are freely patent during the early months of utero-gestation. The outside of the decidua shows numerous cup-like cavities of dilated uterine glands, and the cut edges show the same in section passing from the deep layers towards the surface, giving to the membrane the "lace-like" porous characters so often already quoted. Compare No. 48.113*a*. The other side of the specimen shows the placental site, and the rent leading into the cavity of the decidua reflexa. As far as can be judged in the torn condition of the embryo, the age of the abortion is between 8 and 10 weeks.

48.178. Decidua and Ovum.

Hunterian. RR. 215.

A similar specimen, but rather larger and more opened; "showing more distinctly the angle of reflexion between the decidua vera and the decidua reflexa." The decidua is very thin and porous; the placenta well formed and large. The embryo is absent.

48.179. Decidua, Foetal Membranes, and Embryo.

Hunterian. RR. 217.

A decidua and ovum opened in front, and the embryo hanging out of the cavity. "Showing the navel-string about an inch long, not twisted, the vessels small in proportion to the investing membranes without the interposition of jelly, and the smallest part of the cord where it joins the placenta."

48.180. Decidua and Ovum.

Hunterian. RR. 218.

"An ovum, like many formerly described, and showing particularly the amnion, chorion, and decidua separated from each other." Also the cavity of the decidua, and the projection at the lower end corresponding to the os uteri. The embryo appears about the same age as that in No. 48.167—about six weeks.

48.181. Decidua and Ovum, about Three Months Old.*Hunterian. RR. 249.*

"An ovum between three and four months old." The ovum enclosed in the decidua reflexa is about 7 cm. in diameter. This membrane is thin and membranous but fairly opaque. The decidua is completely opened and inverted, showing the angle of reflexion of the decidua reflexa, and the orifices of the Fallopian tubes opening on the internal surface of the decidua vera. On the other side is seen the decidua serotina covering the exterior of the placenta, torn in several places revealing the chorionic villi embedded in it.

48.182. Gravid Uterus about the Eighth Week. Decidua and Ovum.*Hunterian. RR. 270.*

"An uterus laid open, about 8 weeks pregnant; showing the ovum entirely confined to the fundus uteri; the decidua vera and reflexa." The decidua vera is seen to be the mucous membrane of the uterus and continuous with that of the cervix. A bristle is passed along the left Fallopian tube, which is slit up into its cavity, and appears lying in front of the decidua reflexa. There is a hole at the lower part of the decidua reflexa, marked by bristles, which is "that which would be made by the child in passing from the uterus, but now has been made artificially." The sac of the decidua reflexa has collapsed. It covers the whole back of the cavity of the uterus from the fundus down almost to the os internum of the cervix.

48.183. Gravid Uterus in the Third Month. Decidua and Embryo.*From Dr. Allen Thomson's Collection.*

A human gravid uterus and its appendages, probably between the tenth and twelfth week of gestation. The uterus measures 9 cm. in diameter. It has been injected red, apparently with vermilion, and is laid open from before. Two incisions have been carried from the corners just above and passing in front of the Fallopian tubes to the cervix, joined there by a cross cut, and the flap reflected upwards (lower part of it cut away) displaying the cavity of the decidua (vera) and the rounded sac of the decidua reflexa attached to the posterior wall of the uterus

from about the middle of the fundus down to about 1 cm. from the os internum. It forms a perfect demonstration of the nature and relations of the decidua. A piece of whalebone is passed in by the os; the orifices of the Fallopian tubes are not marked. A large piece of the front of the decidua reflexa and foetal membranes has been removed, and the foetus turned out, showing the cavity of the ovum. The chorion is seen lining the inside of the decidua reflexa, united to it on the non-placental area only by a few thread-like remains of villi. The amnion is turned down around the cord and lies collapsed in the lower part of the cavity of the decidua reflexa, its surface and that of the chorion, with which it had been in apposition, covered with the remains of the delicate fibrous connecting tissue. On the outside of the amnion is seen the umbilical vesicle. An exquisite specimen.

48. 184. Longitudinal Section of Ovum and Decidua.

Hunterian. RR. 235

One half of an ovum with decidua, in the third month, divided longitudinally showing the three parts of the latter, viz., (1) the decidua vera, separated by the cavity of the uterus from (2) the decidua reflexa, and (3) the decidua serotina or placental decidua, where the ovum is attached to the uterus.

48. 185. Longitudinal Section of Ovum and Decidua "about Seven Weeks."

Hunterian. RR. 236.

A similar specimen, but much more perfect, hung upside down, *i.e.* by the cervical end, showing the same as the preceding. The embryo lies on the bottom of the jar. On the outside is seen a hole, which corresponds to the orifice of the Fallopian tube, leading into the cavity of the uterus. The chorion, covered with villi, lines the interior of the decidua reflexa.

48. 186. Longitudinal Section of Ovum and Decidua "about Seven Weeks."

Hunterian. RR. 236a.

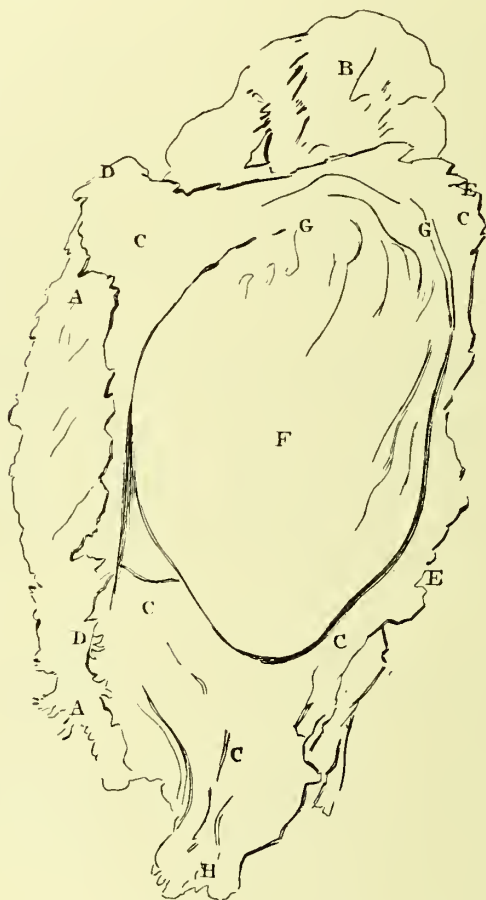
The other half of the preceding.

II.

Y

48. 187. Decidua from "an Abortion of about Nine Weeks."*Hunterian. RR. 254.*

This and the next specimen are halves of what appears to be the abortion from which were taken figs. 1 and 2 of Pl.



XXXIII. of William Hunter's *Gravid Uterus*. This specimen corresponds to fig. 1, the description of which is as follows. The capitals are those of the original line diagram which is reproduced as Pl. V.

"An abortion of about nine weeks, seen on that side which

is membranous. The decidua is torn, and turned somewhat aside to show the smooth and opaque decidua reflexa.

AA. The rough external surface of the decidua, which exfoliated from the womb.

B. The outside of a small portion of the placenta, the rest of which was situated on the back part of this object.

CCCCC. The internal cribriform surface of the decidua, which, in the first months of pregnancy, does not adhere to the membrane which it encloses.

DDDD. The lacerated edge of the decidua, which had been continued into the edge *EEE* of the same membrane.

F. The decidua reflexa spread over the outside of the chorion.

GG. The angle of reflexion at the edge of the placenta, where the inner layer of the decidua is turned over the chorion; much in the same manner as the inner lamella of the pericardium is reflected to cover the outer surface of the heart.

H. The termination of the decidua at the cervix uteri."

48.188. Vertical Section of Ovum and Decidua: "an Abortion of about Nine Weeks."

Hunterian. RR. 268.

The other half of the preceding, corresponding to fig. 2 of Pl. XXXIII. "A vertical section of the same." The capitals are those of the original line diagram, now reproduced as Pl. VI.

"*AAA.* The section of the placenta; which, we must suppose, had adhered to the upper and back part of the womb.

BB. The section of the anterior portion of the decidua.

CC. The section of the posterior portion of the decidua.

D. The termination of the decidua at the cervix uteri.

EE. The cavity of the amnion, in which the embryo hangs by a slender navel string from the inside of the placenta.

F. The section of the three membranes, which are not only contiguous, but adhere to one another, viz, the amnion, the chorion, and the decidua reflexa.



GG. The angle, at the edge of the placenta, where the inner layer of the decidua is reflected over the outside of the chorion.

H. Here those three membranes are a little separated to show their course at the placenta."

The head of the foetus is now absent.

48.189. Decidua at the Third or Fourth Month.

Hunterian. RR. 256.

"A portion of decidua, showing it to be a pretty thick, opaque, porous membrane, in some places perforated by small foramina" (the uterine glands).

48.190. Chorion and Amnion. *Hunterian. RR. 244.*

An ovum "about seven weeks," showing the two foetal membranes separated from one another.

48.191. Decidua, Chorion and Amnion, about the Fourth Month. *Hunterian. RR. 245.*

A portion of an ovum, of considerable size, showing the above three membranes. The decidua was becoming thinner and more lace-like. It was not yet united firmly with the chorion.

48.192. Decidua and Foetal Membranes Separated. *Hunterian. RR. 288.*

"A small portion of decidua, not injected; the amnion and chorion are partly detached, showing the opacity of the decidua better from contrast with the other two membranes which are transparent."

48.193. Decidua and Foetal Membranes. *Hunterian. RR. 289.*

"A portion of secundine, showing the different membranes"; particularly the thread-like remains of villi on the outside of the chorion, which attach it to the decidua.

48.194. Foetal Blood-vessels of the Placenta. *Hunterian. RR. 224.*

"An ovum, with the shaggy vessels of chorion injected red to great minuteness; hardened, and put into oil of turpentine." The specimen is a fairly young placenta unravelled, the vessels of the chorionic villi having been previously injected with vermilion.

48.195. Foetal Blood-vessels of the Placenta. *Hunterian. RR. 224a.*

Similar to the preceding.

48.196. Development of the Foetal Blood-vessels.*Hunterian. RR. 225.*

"Three ova of different sizes with the shaggy vessels (of the chorion) injected to great minuteness." The specimens are fairly young placentae beautifully injected with vermilion.

48.197. The Remains of the Umbilical Vesicle near Term.*Hunterian. RR. 222.*

A portion of foetal membranes, spread upon blue paper, history unknown, but clearly at an advanced stage of gestation, showing the white spot ("vesicula alba") between the amnion and chorion, into which the umbilical vesicle degenerates. There is no distinct trace of the vitelline duct, but several white threads pass from the vesicle, one of which may represent it. Compare Nos. 48.165 to 48.170.

48.198. The Remains of the Umbilical Vesicle near Term.*Hunterian. RR. —.*

Similar to the preceding.

48.199. Remains of the Omphalo-meseraic or Vitelline Circulation about the Fifth Month.*Hunterian.*

(Not numbered nor described.) A foetus about the fifth month, the anterior parietes of the thorax and abdomen removed, except the umbilicus, which is held in position by the umbilical cord and vessels. Part of the liver is removed to show the umbilical vein. Below and to the right of this a considerable length of intestines is stretched out by a bristle, over which lies a little cord rising from the mesentery. This is all that remains of the circulation (called omphalo-meseraic, omphalo-mesenteric, or vitelline), which existed on the umbilical vesicle, and conveyed nutriment from it to the foetus, prior to the development of the placenta.

48.200. Remains of the Omphalo-meseraic Circulation about the Seventh Month.*Hunterian.*

(Not numbered nor described.) Trunk of a foetus about the seventh month, the whole anterior parietes and the liver removed,

showing a fine cord rising from the mesentery, which is remains of the above. The umbilical arteries and urachus well dissected. Injected red.

(b) *The Size of the Foetus at Different Periods of Gestation.*

Here, as perhaps less particularly in other parts of the collection, the effect of the jar in magnifying the contained specimen must be remembered. A proper idea of its size can often be obtained by looking down on it through the glass cover.

48.201. Embryo of "about Six Weeks."

Hunterian. RR. 251.

"A child about six weeks, with part of the amnion preserved, and a very distinct vesicula alba." Compare section Development of the Ovum, Nos. 48.165 *et seq.* Nos. 48.165 and 48.166 are rather younger than this and the following specimens. In this the umbilical vesicle is very small. The allantois is not recognizable. The head has fallen away from the body, tearing the neck and spoiling the relations of parts. The branchial clefts are still very apparent; there is a very large oral cavity, and two little nasal fossae. The anterior thoracic wall is a thin transparent membrane, through which can be seen the heart and lungs. The groove of division of the heart into its two sides is distinct. The lungs are seen as a pair of little buds, one on either side of the aorta. There are faint indications of the digits in the buds of the fore limbs. The vertebral column can be traced through the transparent tissues. The caudal extremity is enclosed but decidedly prominent. In front of it is a prominent tubercle, the genital tubercle; compare Series 51, Embryological Wax Models.

48.202. Embryo of Seven or Eight Weeks.

Presented by Professor Young.

An abortion with thick fibrinous walls, laid open, showing an embryo slightly more advanced than the preceding. Shows the segmentation of the vertebral column, and the eye, as a distinct black ring with a white centre, on the side of the head.

43. 203. Embryo and Membranes about the Eighth Week.*Hunterian.*

(Not numbered but apparently Hunterian.) The embryo is slightly larger and better formed than the preceding. Arm and forearm, thigh and leg, and the digits in the fore limbs are distinct. These last are faintly indicated in the hind limbs. The neck has been torn across. The thoracic wall is very thin, but there is no appearance of the branchial clefts remaining. The mass of membranes and decidua is several times as large as the embryo, which measures about 2 cm. in length; its head is nearly as large as its body.

43. 204. Embryo and Membranes about the end of the Second Month.*Hunterian. RR. 230.*

An embryo slightly larger than the preceding ($2\frac{1}{2}$ cm. long), and better shaped. The eyes are on the front of the head; the mouth is small, and there are rudiments of a nose, and external ears. The anterior wall of the thorax is opaque and strong. The mass of the membranes very large in proportion to the foetus.

43. 205. Embryo early in the Third Month.*Hunterian. RR. 226.*

It is about 3.5 cm. long. The limbs are well formed. A mass of intestines protrudes from the umbilicus. The feet interfere with the view of the external genitals; these consist of two folds with a cleft between them, and the rudimentary penis or clitoris projecting about 1 mm., covered, as with a hood, by the anterior parts of the folds; the condition hardly allows a definite statement as to the sex of the embryo; compare Series 51, Embryological Wax Models.

43. 206. Embryo in the Third Month. Ossification.*Hunterian. RR. 297.*

An embryo very similar to specimen No. 57 in Series 1, Development of Bone, but less transparent and therefore showing the centres of ossification less plainly. It is very thin, and the double ridge of laminar processes of the vertebral column can be clearly seen, showing that the osseous canal is still open in its whole

length. The interval between the processes is narrowest in the upper dorsal and widest in the lumbar and upper cervical regions. The genital organs are similar to those of the preceding.

48.207. Embryo and Placenta "between Two and Three Months."

Hunterian. RR. 273.

An embryo 4 cm. long and well formed. The placenta is very much larger than it. The umbilical cord is long and untwisted; it shows two false knots (compare 48.80). The embryo seems to be of the male sex; the genitals are not in position to be seen well, but there is a small well formed penis, and neither cleft nor folds behind it.

48.208. Embryo and Placenta in the Third Month.

Hunterian. RR. 341.

(Not described.) A similar but considerably larger specimen, probably about the end of the third month. The foetus is 5.8 cm. long. It is of the male sex. The penis is well formed, but there is hardly a trace of scrotum.

48.209. Embryo in the Third Month.

Hunterian. RR. 300.

A male embryo about the same size as the preceding.

48.210. Embryo about the end of the Third Month.

Hunterian. RR. 301.

A similar embryo enclosed in its amnion.

48.211. The Viscera in an Embryo about the end of the Third Month.

Hunterian. RR. 302.

"An embryo about three months (male), opened so as to give a general view of the thoracic and abdominal viscera: the liver is much larger in proportion than in the adult, occupying more than one-half of the cavity of the abdomen." 6.5 cm. long.

48.212. The Viscera in an Embryo about the end of the Third Month. *Hunterian.*

(Not numbered, but probably Hunterian.) A similar embryo with the liver removed, showing the stomach opened and a bristle placed in its cavity; also the pericardium.

48.213. The Viscera in an Embryo in the Fourth Month. *Hunterian.*

(Not numbered, but probably Hunterian.) A male embryo 9.2 cm. long, the veins injected red, but not very finely. The liver removed. Shows the pericardium, the shape of the heart, and the distribution of the principal veins.

48.214. The Viscera in an Embryo in the Fourth Month. *Hunterian.*

(Not numbered, but probably Hunterian.) A female embryo about 11 cm. long, coarsely injected red. The abdominal parietes are dissected to show the roots of the umbilical cord,—viz., the hypogastric arteries rising up from the sides of the bladder, and the umbilical vein passing into the great fissure of the liver. The clitoris, nearly as large as the penis would be at the same age, projects beyond the labia, and fills up all the space between them.

48.215. Embryo and Placenta in the Fourth Month.

Hunterian. RR. 304.

“A child and placenta, a little more than three months, the navel string is of considerable length, and is convoluted.” The placenta is fully formed and about as large as the foetus—a great difference from the condition in the second and third months.

48.216. Foetus in the Fourth Month. *Hunterian. RR. 305.*

A considerably larger female foetus, measuring from top of head to end of body, 13.5 cm. “Little more than four months; extremities still small in proportion; the preputium clitoridis projects much beyond the labia so as to give the appearance of a male, although it be a female; the skin is removed from a part of the left leg showing the muscles.”

48.217. Foetus and Placenta "about the Fifth Month."*Hunterian. RR. 349.*

The foetus, a female, and placenta both injected red. Showing the relative size of the two at this stage.

48.218. "Foetus about the Sixth Month."*Hunterian. RR. 196.*

The length from the crown of the head to the hinder end of the body is about 17 cm. It is very thin ; shows the line of the ends of the ribs very well.

48.219. "Foetus at end of Sixth Month."*Hunterian. RR. 197.*

This specimen appears to be the foetus from the subject from which were taken Plates XXIII. and XXIV. of Hunter's *Gravid Uterus*. It is there described as "from the eighth subject at six months." It is placed "with its head downwards, and coiled together, resembling a child in the common situation in utero." (Catalogue.) The cord has been untwined from its original position, otherwise all is as in the plate.

48.220. "Foetus about Six and a Half Months."*Hunterian. RR. 306.*

A male foetus, very dark coloured in patches.

48.221. Foetus "about Six and a Half Months."*Hunterian. RR. 307.*

A female foetus, injected red.

48.222. The Viscera in a Foetus about Six and a Half Months Old.*Hunterian. RR. 350.*

"A child (female) injected, with the parietes of the thorax and abdomen removed, showing the general situation of the thoracic and abdominal viscera." Shows the cut ends of the hypogastric arteries and umbilical vein, the last ligatured at the longitudinal fissure of the liver. The thymus gland is seen above the heart. Compare Nos. 10.8 to 10.15, series Heart and Arteries.

48.223. The Viscera in a Foetus about Seven Months.*Hunterian. RR. 350a.*

Similar to the preceding but larger ; part of the umbilical cord attached.

48.224. Foetus in the Seventh Month. *Hunterian. RR. 308.*

A male foetus slightly larger than the preceding ; the scrotum well formed, but the testicles not descended.

48.225. Foetus in the Seventh Month. *Hunterian. RR. 309.*

Similar to the preceding.

48.226. Foetus in the Seventh Month. *Hunterian. RR. 310.*

Similar to the preceding. So exactly do these three resemble one another, it seems possible that they were triplets.

48.227. The Muscles in a Foetus between Seven and Eight Months. *Hunterian. RR. 311.*

A female foetus, considerably larger than the preceding, "with the integument from the right half of the body taken off, showing the superficial muscles." Beautifully dissected. The clitoris is now comparatively small, but still shows distinctly between the labia majora.

48.228. Foetus and Placenta at Full Time, mounted in the Natural Intrauterine Position.*Hunterian. RR. 91a.*

(Not described.) A full time female foetus and placenta, mounted in a large jar as described above. The limbs are folded upon the body, the placenta towards the front and right side of the body and limbs of the foetus, and a turn of the cord round its neck. The cord does not appear to be unduly long ; the turn round the neck would consequently have been a complication of some moment during delivery.

SECTION IV.

*Comparative Anatomy of the Placenta and Membranes.***48.229. Mucous Membrane of Gravid Uterus of Sow.
Diffuse and Non-deciduate Placentation.***Hunterian. RR. 347.*

“A section of the gravid uterus from the sow, showing the inner membrane extremely vascular, which in that animal joins with the chorion without the intervention of a placenta.” The mucous membrane is thrown into innumerable fine rugae, traversed by a rich capillary plexus. To this rugous surface is adapted a correspondingly rugous surface of chorion, extremely vascular with foetal vessels. Between the vessels of these two surfaces the interchange of nutrient material and gases goes on as in the more highly specialized placentae of other mammals. The hypertrophied mucous membrane and the chorion form a placenta simply by apposition of the two surfaces, all (or nearly all) over the inside of the uterus, without any interlacing of their structures; in parturition the chorion simply strips off from the uterine mucous membrane, and scarcely any uterine tissue is shed. From these two circumstances, this form of connection between the mother and the foetus is described as diffuse and non-deciduate.

**48.230. “Chorion from the Mare.” Diffused Placenta;
Foetal Portion.***Hunterian. RR. 354.*

“A portion of the chorion from the mare; the arteries being injected red, and the veins yellow; and showing on the side next the uterus an infinite number of small tubercles consisting of shaggy vessels, forming a bond of union between the chorion and the uterus and serving the purpose of placenta.” The chorion appears as a very vascular membrane covered with small globular highly vascular processes (the “tubercles”), which fitted into crypts in the uterine mucous membrane. With a magnifying glass each process can be seen to be covered with innumerable fine vascular villi—the villi of the chorion. The vessels of these villi come into intimate relation with the maternal blood-vessels in the walls of the crypts, and the usual interchanges occur as in any other placenta. There is no specimen of the hypertrophied and pitted mucous membrane which forms the maternal portion of the placenta of the mare, but the

previous specimen (mucous membrane of the gravid uterus of the sow) shows the maternal portion of a diffused placenta of a similar, if slightly simpler, form. As in it, there is no regular decidua shed along with the chorion, but it is probable that there is some maternal tissue entangled among the chorionic processes. Compare Placenta of Sheep, No. 48.244.

48.231. "Chorion of Mare."

Hunterian. RR. 234a.

Another portion of the same, dried, and the inner surface turned to the observer to show the rich plexus of arteries and veins belonging to the foetal part of the placenta. The arteries are injected red, the veins yellow.

48.232. Placentula of Cow. Foetal and Maternal Structures partly separated. Polycotyledonary Placentation.

Hunterian. RR. 314.

"A portion of the gravid uterus from the cow, injected; showing the infantile part of the placenta partly separated from the maternal, which arises from the uterus like a rounded sponge, having irregular openings on its surface to receive the processes of the infantile part; the infantile part is highly injected from the vessels of the navel string." The chorionic villi form beautiful feathery tufts. The placenta in the cow is formed of a considerable number of these placentulae, scattered over the inside of the uterus. Compare No. 48.240.

48.233. Foetal Part of Placentula of Cow.

Hunterian. RR. 315.

The foetal part of a similar placentula, separated from the maternal. "It looks a good deal like the unravelled human placenta, but consists more of separated bundles of vessels." Each bundle represents a highly developed villus of the chorion. It forms a tuft, about 1 cm. long, consisting of a central stem with innumerable delicate processes spreading out in all directions like the branches of a pine tree from the trunk. In some the stem is also branched. The vessels of the chorionic villi are finely injected red.

48.234. Foetal Part of Placentula of Cow.

Hunterian. RR. 316.

Similar to the preceding, but more finely injected. The parts

of the chorion which have not shared in the formation of the placenta are also highly vascular—some areas more so than others; the more vascular areas are distinctly villous, but the villi are very small. The villi of the placentulae appear to have drawn clean out of the maternal crypts, there being, as in the preceding diffused placentae, no shedding of a definite decidua.

48.235. Foetal Part of Placentula of Cow.

Hunterian. RR. 317.

Similar to the preceding but larger; the chorionic villi of the placentula are much larger; they have separated from the maternal part of the placentula quite as cleanly, and without anything like a definite decidua adhering to them. The non-placental areas of the chorion contain a number of vessels, though less than in the preceding.

48.236. Foetal Part of Placentula of Cow.

Hunterian. RR. 319.

Similar to No. 48.233, dried and mounted in turpentine.

48.237. Foetal Part of Placentula of Cow.

Hunterian. RR. —.

Similar to the preceding. Mounted in turpentine.

48.238. Foetal Part of Placentula of Cow.

Hunterian. RR. —.

Similar to the preceding. In turpentine.

48.239. Chorion and Foetal Part of a Placentula.

Hunterian. RR. 107a.

(Not described.) A portion of chorion with one placentula, from which the maternal part has been detached. The placentula is much smaller than any of the preceding. It is finely injected red. The non-placental area of chorion is highly vascular, especially where it is covered with processes, which are mostly like villi, but some of them short ridges. Between these are less vascular lines and areas.

48.240. Maternal Part of Placentula of Cow.*Hunterian. RR. 320.*

"A portion of gravid uterus from the cow; showing the oval fungus of the maternal part of the placenta, resembling in its surface pretty much a cauliflower. This and the foregoing preparations show that in many quadrupeds the maternal and infantile parts of the placenta are quite distinct in structure from each other, and may throw light on the human placenta, where there is a more intimate (connection) between the foetal and maternal portions." William Hunter's other writings show that it was for the very purpose mentioned in the last sentence of the above quotation from the old catalogue that he used this and other specimens of the placentae of the lower animals. He was able to separate the two parts with ease in animals, but in the human subject, owing to the intimate relations between them, it was almost impossible to do so without destroying the uterine portion,—in the full time placenta quite impossible. "In the placenta of an earlier age the union of the two constituent portions is less intimate and they may both be preserved very entire, like the vascular chorion and fungus in the quadruped." "I did this operation in a conception of four months, and still preserve the uterine part attached to the inside of the uterus." There is no such specimen in the collection. See No. 48.123 *et seq.*

48.241. Maternal Part of Placentula of Cow.*Hunterian. RR. 329.*

"A portion of gravid uterus; showing one cotyledon and the inner membrane partly detached so as to look down upon the substance of uterus; the inner membrane is perforated by a prodigious number of small holes." These are the orifices of uterine glands, somewhat dilated. Injected red; appears highly vascular.

48.242. Polycotyledonary Non-deciduate Placentation. Cow.*Hunterian. RR. 321.*

One cornu of the gravid uterus of a cow inverted, and the foetal membranes removed, showing about twenty-four maternal cotyledons ("uterine fungi") of various sizes, scattered over the inside of the organ. At one part of the cut edge is seen a great mass of the uterine vessels, injected red. In the old catalogue it is described as

"from the sheep," an obvious slip; No. 48.243 is a similar preparation from the sheep. (In this portion of the old catalogue there are numerous errors, as if the specimens had at some time got mixed up and been wrongly labelled by some person who did not understand them, *vide* Preface.)

48.243. Polycotyledonary Non-deciduate Placentation. Sheep. *Hunterian. RR. 322.*

One cornu of the gravid uterus of a sheep, inverted, and the foetal membranes removed, showing numerous cotyledons or placentulae. In contrast with the specimens from the cow, while the transparent non-placental parts of the foetal membranes have been removed, the placental parts of the chorion remain embedded in the cotyledons of maternal tissue; compare succeeding specimens, which show the two portions separated. The uterine arteries are injected red, the veins blue; foetal arteries green, veins yellow.

48.244. Cotyledon of Placenta of Sheep. *Hunterian. RR. 323.*

A single cotyledon from the same uterus as the preceding, dried, and mounted in turpentine. The placentula is a globular knob, about 2.5 cm. in diameter, set into the uterine wall up to about a third of its height. Its sides are clothed by a prolongation of the highly vascular uterine mucous membrane, and its apex is occupied by the narrow base of the foetal portion of the placenta.

48.245. Placentula of Sheep. Maternal and Foetal Portions Separated. *Hunterian. RR. 324.*

Part of the gravid uterus and foetal membranes of a sheep, showing a single placentula. The foetal portion has been drawn out of the maternal, and hangs below with part of its clear membranes. The uterine arteries have been injected red, the veins blue; the foetal vessels are uninjected. The maternal portion is cut at the sides, and also one side has been torn in the extraction of the globular foetal portion. In the section of the maternal portion appears the outer layer of mucous membrane, running up to the neck of the foetal portion. Enclosed in that, and connected with it by a stratum of loose fibrous tissue, is a distinct fibrous sac perforated by

numerous arteries and veins; within this sac is a loose highly vascular tissue thrown into innumerable fine processes, in the interstices of which lay the chorionic villi. Below hangs the velvety, or rather woolly-looking, ball of chorionic villi, which is the foetal portion of the placenta. The intermingling of the two portions is more complex and intimate here than in any of the preceding specimens, and their separation (at least their artificial separation) is attended by a certain amount of visible laceration of maternal tissues. Compare next specimen.

48.246. Foetal Portion of Placentula of Sheep.

Hunterian. RR. 313.

A portion of foetal membranes of a sheep, with two of the cotyledons drawn out of their maternal envelopes. Injected white from the foetus. They are globular tufts of highly developed chorionic villi, set on narrow bases (about half the breadth of the tuft) through which enter the umbilical vessels. Between the foetal villi here and there are fragments of the maternal processes, injected red and blue. Here there is clearly a shedding of maternal tissue—a decidua—but not a regular decidual membrane as in the carnivora and primates.

48.247. Sections of Placentula of Sheep.

Hunterian. RR. 325.

“A portion of uterus, with a perpendicular section through three of the above, showing structure and connection.” Injected red and blue from the mother.

48.248. Sections of Placentula of Sheep.

Hunterian. RR. 326.

A similar preparation, with four cotyledons cut in various directions, and one whole one with the uterine wall stripped from its base, to show its fibrous capsule and the maternal vessels entering it; injected red and blue. In the sections the uninjected villi are seen cut in various directions, mostly oblique and transverse. Their tissues present in section a clear glancing appearance. In the transverse sections the bunch of these glancing villi is seen permeated by yellowish processes of maternal (decidual)

tissue, bearing rich plexuses of red and blue vessels. The injection being comparatively coarse, only the larger vessels are injected. It conveys an exceedingly good idea of how the maternal and foetal circulations are brought into the intimate relationship necessary for the interchanges that take place between them.

48.249. Placentula of Sheep and Corpus Luteum.

Hunterian.

A small portion, probably of the same uterus, with one cotyledon partly dissected, showing the uterine vessels below it and some of the villi. Also the Fallopian tube and ovary. The latter is split open, showing a corpus luteum occupying nearly the whole of the organ. Coarsely injected blue and red.

48.250. Uterus showing Polycotyledonary Placentation.

Hunterian. RR. 327.

"Two horns of the uterus laid open; showing a prodigious number of cotyledons of different sizes; the ovarium laid open exhibits sections of two corpora lutea, very much resembling the corpora lutea in the human subject." Species of animal unknown. The foetal parts of the cotyledons have been removed with the membranes, leaving the maternal parts as flat buttons deeply and closely pitted on the free surface. Somewhat like that of the cow.

48.251. Uterus showing Polycotyledonary Placentation.

Hunterian.

(Not described.) An uterus divided into two cornua, distinct right down to the os externum; slit open and the membranes removed showing very numerous cotyledons from which the foetal structures have not been detached.

48.252. Amnion containing Foetal Calf.

Hunterian. RR. 344.

"Amnion containing a young calf; at the lower part is a globule of mercury to sink the preparation." There are no blood vessels in the amnion.

48. 253. Allantois, probably of a Ruminant.*Hunterian. RR. 339.*

This specimen, by some strange slip, is described in the old catalogue as "an amnion filled with spirits and its vessels injected with quicksilver"; surely not an error of William Hunter, who was familiar with the allantois in quadrupeds, though he denied its existence in the human subject. It is undoubtedly an allantois, probably from one of the ruminants, in which the organ attains a large size. See under Nos. 48.242 and 48.256, and in the introduction.

48. 254. Allantois, probably of a Ruminant.*Hunterian. RR. 340.*

A similar but much larger specimen, fully as large as the foetal head at term, its vessels injected with mercury, blown up, dried, and mounted in turpentine.

48. 255. Allantois, probably of a Ruminant.*Hunterian.*

A large sac with pedicle, evidently the same structure as the preceding; Hunterian, but not numbered nor described. It is larger than the preceding. The blood-vessels are injected red, and it is mounted in the usual way in spirit. It appears to be formed of an opaque fairly thick and fairly vascular membrane. The pedicle is laid open, its middle segment is expanded into a considerable bag with a very much plicated lining, not unlike the mucous membrane of the urinary bladder, and the segment distal from the sac is a thin membranous tube, in which a bougie is placed. Probably the bag and tube are the urinary bladder and part of the urethra, which during intrauterine life are continuous with the allantois.

48. 256. Allantois, probably of a Ruminant.*Hunterian. RR. 342.*

A small sac of semi-transparent white membrane, with a pedicle below and two somewhat puckered corners above; apparently another example of the above. Uninjected. Described in the old catalogue as "apparently a portion of the amnion from a quadruped," a description clearly not written by the person who made the specimen. See under No. 48.242.

48.257. Uterus of Carnivore showing Zonary Placentation.*Hunterian. RR. 328.*

"Two horns of a gravid uterus, where the cotyledons are at pretty regular distances from each other, and are oblong in their shape, forming belts on the inside, surrounding the cavities of the horns: probably from the bitch."

48.258. Puppy enclosed in Foetal Membranes, showing the Zonary Placenta.*From Dr. Allen Thomson's Collection.*

The puppy is seen through the sac of transparent chorion and amnion, with its limbs folded, forming a long oval, round which, nearer the caudal end and at a level corresponding with the umbilicus, lies the placenta in the form of a complete ring, as was seen in the preceding. The placenta forms a comparatively narrow zone occupying only one-sixth of the length of the chorionic sac. The puppy is of considerable size, apparently near birth.

48.259. Zonary Deciduate Placenta and Allantois. Dog.*Hunterian. RR. 332.*

"A puppy lying transversely, enclosed in amnion; between amnion and chorion may be observed a double conical membrane called allantois, losing itself at each extremity in chorion; there is also seen a portion of the placenta which is tuberculated on its surface and oblong in its shape; the placenta is in some degree vascular from the uterus, and a membrane corresponding to decidua is partly detached, also vascular." The decidua is recognizable at the edges of the placenta; it is reflected to a very slight degree over the exterior of the chorion. With a lens can be seen the broken stems of numerous arteries ramifying a short distance on the surface of the placenta and then dipping into its substance. The placenta occupies about half of the chorion; contrast its size relatively to the foetus in this, which is from an early stage of gestation, with that in the preceding, which is from a late stage.

48.260. Zonary Deciduate Placenta and Allantois. Dog.*Hunterian. RR. 333.*

"Ditto, foetus not enclosed in amnion; the allantois more

distinct than in the former preparations." The sac of the allantois is quite distinct, occupying the corner between the branching umbilical vessels. Compare next specimen.

48.261. Placenta and Umbilical Vessels. Dog.

Hunterian. RR. —.

A puppy, with the placenta partly injected red from the uterus. The abdomen is opened and the umbilical cord dissected, showing the manner in which the vessels branch in the cord and are distributed to the placenta in about four sets.

48.262. Placenta, Decidua, and Omphalo-mesenteric Vessels in a Foetal Dog.

Hunterian. RR. 334.

A foetal dog, with the placenta coarsely injected red from the mother. "Amnion opened and abdomen opened, showing omphalo-mesenteric vessels; decidua behind partly detached." The omphalo-mesenteric (omphalo-meseraic) vessels—the remains of the vessels of the umbilical vesicle—appear as two little white threads which detach themselves from the umbilical cord just inside the umbilicus, and run across the peritoneal cavity to the root of the mesentery.

48.263. Placenta and Omphalo-mesenteric Vessels. Dog.

Hunterian. RR. 335.

A similar specimen. "The last mentioned vessels seen injected, and the placenta injected to great minuteness both from foetus and mother." The omphalo-mesenteric vessels are very distinct. The maternal structures covering the exterior of the placenta are finely injected and very distinct, showing that the shed placenta in the dog is composed of a foetal portion and a maternal portion which is thrown off along with it—a distinct and definite decidua.

48.264. Omphalo-mesenteric Vessels. Dog. *Hunterian. —.*

A considerably larger foetal dog, the abdominal parietes removed, and the mesentery spread out. The bladder and part of the umbilical cord are held up by a thread; from the position where the abdominal walls formed the umbilicus, two white threads are seen passing to join the blood-vessels of the mesentery at two points which lie a considerable distance from one another.

48. 265. Foetal Dog and Zonary Placenta.*Hunterian. RR. 336.*

A similar specimen, the placenta very finely injected "from the mother." No injection in the foetal vessels. The amnion, described in the former catalogue as "entire," is now very much torn and reflected from the foetus.

48. 266. Zonary Placenta and Chorion of Dog. Inverted.*Hunterian. RR. 337.*

"The veins are injected, and they may be seen beautifully ramifying on the chorion"—on the non-placental as well as the placental area.

48. 267. Uterus, Placenta, and Membranes of Dog.*Hunterian. RR. 338.*

"A portion of uterus, placenta, and membranes; the internal surface of uterus is seen very vascular; the placenta is irregularly furrowed where it is in contact with the uterus; the decidua may be seen resting partly on the uterus, and partly on the placenta; placenta is injected partly from the womb, and partly by the navel-string; the navel-string injected red and white." The red is now a dark lake, which is probably in consequences of changes in the pigment such as are seen in a number of specimens in the intestine series. The uterine vessels are full of a similar dark colouring matter. At the edges of the placenta appear a number of distinct floating chorionic villi, with a few vessels in them filled with the dark injection from the umbilical cord.

48. 268. Zonary Deciduate Placenta of Cat.*Hunterian. C. 1a.*

The placenta and membranes of a kitten, inverted, injected red by the maternal vessels and white and black by the foetal artery and vein respectively. The placenta on its outer surface is very finely lobulated. It is to a very considerable degree injected red, showing that a large part of it is deciduous maternal tissue. The remains of the amnion are also preserved. This specimen was formerly classified in Series C, Veins, and described as follows:

"The placenta and membranes of a kitten. On the membrane in one place is seen an artery and vein meeting: the first white, the other black. This is either the origin of a vein, or it may be the injection returning from the artery at one place by the vein stopping till the venal injection meets it."

48.269. Foetal Rodent showing Discoidal Deciduate Placenta. *Hunterian.*

(Not numbered nor described.) Apparently a nearly full-grown foetal rabbit enclosed in the amnion, with the remains of the chorion and the placenta; maternal vessels injected red. The placenta is placed on the left side of the foetus near its middle. It is round, discoid, and very like the human. It is finely lobulated. Parts of its surface are injected, parts not. It shows the orifices of several large vessels torn across in separating it from the uterus. Compare Series 47, Generation; Rabbits.

48.270. Discoidal Deciduate Placenta of Rodent.

Hunterian.

(Not numbered nor described.) A portion of uterine wall, and a placenta similar to that in the preceding specimen; the maternal vessels injected red. The placenta has been almost completely torn from the uterus, leaving a site very like that which is seen in the human subject. The interlacing muscular fibres appear to be laid bare, and between them are the mouths of numerous large torn vessels. Orifices corresponding to these are, but with some difficulty, distinguishable on the corresponding surface of the placenta.

48.271. Foetal Sloth with Discoid Lobulated Placenta.

Hunterian.

This specimen is neither numbered nor described, but appears to be Hunterian. The foetus is enveloped in a smooth, white, semi-transparent membrane—the amnion fitting it closely at all points, and presenting the appearance of a hairless skin. At several points it is burst, showing the real hairy skin of the animal. It is about the size of a five months' human foetus. From the umbilicus

hangs the placenta by a cord 11 cm. long, which is twisted like the human. The placenta is preserved inside the portion of uterus to which it was attached. It forms a thick mass packed into a corner of the uterus, of circular shape, and very distinctly lobulated. The cord is inserted at one side, and its vessels ramify over the lobules. In shape, therefore, it is intermediate between the cotyledonary and the discoidal. Being intact, no further details of its structure are visible.

SERIES 49.

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SECTION I.

ABNORMAL PREGNANCY.

(a) *Twins.***49.1. Twins; one Foetus Blighted.** *Hunterian. RR. 91.*

“An ovum where there had been twins; one child only remains, apparently near the full time, but blasted and shrunk.” There is one large placenta, which on careful examination can be seen to consist of two placentae corresponding to the two foetuses. The line of junction is indistinct, but the two are quite distinguishable, because, whereas that of the blighted foetus is firm and solid, that of the other presents the normal spongy lobulated appearance. There are two distinct amniotic sacs, and two umbilical cords; that of the blighted foetus is so thin and so tightly twisted, that, latterly at least, it was probably functionless. The stump of the other is normal. Another case of twins is described under No. 48.78.

(b) *Extrauterine Gestation.***49.2. Tubal Pregnancy. Rupture. Formation of Decidua in Uterus.** *Hunterian. RR. 367.*

“An uterus where there had been an ovum in one of the Fallopian tubes; the Fallopian tube is distended to nearly the size of a hen’s egg, and has been ruptured; the ovum probably passing out into the cavity of the belly; what is remarkable is the increase of the uterus, as if it contained an ovum, and the presence in it of the decidua, which is clearly proved by this preparation to be formed by the uterus, and to be independent in some measure of the ovum. The foetus was found in a coagulum, and is preserved in the bottle marked *RR. 291.*” (Now No. 48.160.) The conception has

occupied the middle segment of the Fallopian tube, rather near the outer end, about 3 cm. of the inner part and only 1 cm. of the outer being unoccupied. It forms an oval dilatation, now hardly so large as is stated above. There is a large rent on the upper and anterior surfaces of the tube about the junction of the outer and middle thirds. The edges of the torn sac are very thin and transparent. The calibre of the tube either way is blocked by a firm fleshy mass. Some villi of the chorion appear towards the distal end. As mentioned above, the cavity of the uterus is considerably enlarged, and the mucous membrane is hypertrophied, presenting the usual appearance of the decidua as it is seen in a miscarriage which has not been long retained. Bristles mark the orifices of the Fallopian tubes. Compare, under Development of the Decidua, No. 48.175 *et seq.*, and Abortions, Nos. 49.35 *et seq.* The foetus is perfectly formed, and apparently about ten weeks old.

49.3. Tubal Pregnancy. Formation of Decidua in Uterus.

Hunterian. RR. 368.

The other portion of the preceding.

49.4. Tubal Pregnancy. Removal by Operation after Rupture.

Presented by Dr. J. K. Kelly, 1897.

Ruptured Fallopian tube and ovum. The following history of the case is taken from the account of it published in the *Glasgow Medical Journal*, Vol. 38, new series, 1892, by Dr. J. K. Kelly. Patient was confined of her only child in 1882. Subsequently she suffered from dysmenorrhoea and leucorrhoea. In December, 1890, she was found to be suffering from severe endometritis, which probably accounted both for her suffering and for her sterility. After treatment by swabbing with carbolic acid had failed, the uterus was curetted in June, 1891. About the middle of April, 1892, after an interval of six weeks, menstrual discharge appeared in small quantity, and she felt rather ill. The bloody discharge continued more or less up to the first of May, when her medical attendant was called in. She then presented no definite symptoms of illness. Next day she was seized with vomiting and great abdominal pain, but there was nothing that suggested the idea of bleeding. The uterus was enlarged, and there was some swelling alongside it. Patient believed

she was pregnant. On the morning of the third of May signs of internal haemorrhage were distinct, and the swelling beside the uterus had increased. By noon the whole right side of the pelvis was filled by a soft tumour which pushed the uterus to the left, filled the pouch of Douglas behind, and gave dull percussion up to midway between the pubis and the umbilicus. Pulse 120 and feeble, face pallid, and vomiting frequent. Ruptured tubal pregnancy was diagnosed, and abdominal section was performed with as little delay as possible. The peritoneum contained a vast quantity of venous blood and soft clots. The uterus was soft and somewhat enlarged. "At its right angle the Fallopian tube was caught, and out from this a soft mass was traced and turned out, consisting of the ruptured Fallopian tube and foetus of about 7th or 8th week, hanging in its intact membranes from the place of rupture." The ovary was also turned out, the pedicle ligatured, and the whole mass removed. Patient did not rally, and died the following morning. The specimen consists of the parts just as removed at operation, but cleared of blood clot. It is hung by the dilatation of the Fallopian tube in which the ovum lay. The ovum had occupied the outer third of the tube; the rent by which it escaped is on the upper surface, and extends almost but not quite into the circle of the fimbriae. The ovum lies opposite the rent, nearly all outside the tube, but connected with the inside of the sac by a mass of villi. "The ovum was about the size of an orange, and the outer end of the Fallopian tube, in which the placenta lay, had contracted from this size to about that of a walnut. The contraction, however, was evidently not sufficient to exercise any pressure on the bleeding vessels." It has now shrunk considerably from abstraction of some of its watery contents by the spirit in which it is mounted.

49.5. Tubal Pregnancy. Removal by Operation. Tubal Abortion.

Presented by Dr. J. K. Kelly, 1897.

A Fallopian tube, laid open, illustrating the above. The following history of the case was supplied by Dr. Kelly. "Mrs. M., aet. 21, had a child, 20th September, 1896—post partum haemorrhage. June, 1897 abortion (?) at 3 mos.—great haemorrhage. October, 1897, flooding at time menses were due, followed in a fortnight by supposed abortion, with expulsion of material like membranes from the uterus. Severe hypogastric pain and

uterine haemorrhage persisted till admission to hospital on 29th November, 1897. On admission, the uterus was found enlarged; cavity 3 inches; os patent; irregular rounded doughy mass about size of orange to right of and behind uterus, but not filling Douglas' pouch; tender to pressure. Pulsation of right uterine artery very marked. Diagnosis—ruptured tubal pregnancy. In hospital the mass gradually increased in size, pain and haemorrhage continued. December 4, abdominal section; December 19, patient dismissed well." The outer segment of the tube is distended to a very considerable degree, forming a mass of long oval shape, measuring 6.5 by 2.5 by 2.5 cm., which is split longitudinally. The fimbriated extremity crowns the outer end of the mass; its orifice is slightly open. The tube is filled with a mass of dense blood clot, in the centre of which is a small cavity lined with soft clear membrane, apparently the amnion; there is no embryo. Attached to the inner end of the dilatation of the tube is a well-formed placenta; its intervillous spaces are packed with blood. The clot has been turned out from one half of the tube (it lies on the bottom of the jar); the inner orifice (towards the uterus) appears to be patent; the wall of the tube is uniformly thickened. The probable course of events has been (1) a slow bleeding from the placenta, crushing the conception and distending the tube; (2) firm clot has formed over the fimbriated orifice and prevented any considerable bleeding into the peritoneum, and the even distension and the thickening of the tube have prevented rupture; contrast Nos. 49.3 and 49.6. It is a typical tubal abortion, or what prior to the discovery of the true nature of such specimens, would have been called haematosalpinx. Compare Abortions, Nos. 49.49, 49.50, etc.

49.6. Extrauterine Pregnancy.

Hunterian. R.R. 369.

"A longitudinal section of uterus, where a placenta is seen extraneous to the uterus, and occupying a Fallopian tube: the uterus in this case has not increased very much in size." The sac in which the conception lay is about the size of a cricket ball. Its anterior wall is cut away, showing the interior; a small withered-looking placenta and the stump of the umbilical cord are seen on the posterior wall; the sac is 1 to 2 mm. thick. Part of its inner side, low down, is attached to the cervix uteri; the rest of that side is altogether free. The outer part of the

broad ligament lies nearly horizontal, spread out over and adhering to the top of the sac; the inner part is quite free from the sac; so that there is a triangular clear space between the side of the body of the uterus, the inner side of the sac, and the posterior (now under) side of the inner part of the broad ligament. In the front view the cut edge of the broad ligament is seen above the cut edge of the sac wall (it is cut rather too short for clearness); both the layers and the fold in which the round ligament of the uterus lies are seen clear of the sac wall. The ovary, recognizable by the remains of Graafian follicles, is seen just below the cut end of the round ligament of the uterus flattened out and incorporated with the wall of the sac. In the back view, the Fallopian tube, in what by the twisting of the broad ligament has become its posterior edge, passes on to the top of the sac and its outer half becomes firmly united to it and flattened out upon it. Below the inner (free) segment of the tube is seen the round ligament of the ovary running outwards and forwards to the ovary, whose relations to the sac have already been seen in the front view. The segment of the Fallopian tube adhering to the sac has been laid open; it is slightly dilated; a bristle is passed into the uterus, but the outer end is blind; this blind end lies at the edge of a rounded bulging of the sac, which corresponds to the attachment of the placenta. About a quarter circle round the placental bulging, from the point where the Fallopian tube meets it, is a cyst about the size of a large pea, hanging by a short stout stalk, which appears to be the hydatid of Morgagni. There is no other indication of the fimbriated extremity of the tube. The lower half of the surface of the sac has a fibrous appearance as if it had been dissected out; the upper half being covered by Fallopian tube, broad ligament and ovary, is smooth like serous membrane. The relations of the various structures can hardly be determined. From the relations of the sac to the broad ligament, tube, and ovary, and of the placenta to the end of the tube and the hydatid of Morgagni, it appears probable that the old description is right, and that the conception was formed in the outer segment of the Fallopian tube; probably at a later period it passed more or less completely out of it, through the natural orifice or through a rent as in No. 49.4, into the peritoneal cavity, and developed in the pouch of Douglas, below and behind the ovary and broad ligament. It is certainly not between the folds of the ligament nor in the ovary.

49.7. Extrauterine Foetus from the preceding.*Hunterian. RR. 370.*

"The foetus belonging to the last number ; very much defaced and compressed." Its size shows that a very considerable portion of the sac has been cut away. It was probably in the fifth month. The conception in its sac had probably risen out of the true pelvis into the abdomen dragging the uterus up with it.

49.8. An Extrauterine Foetus.*Hunterian. RR. 378.*

"An extrauterine foetus, very much deformed : the face scarce, or rather not at all, distinguishable ; the upper extremities lost and the two lower jutting out, exactly resembling what are called drumsticks in a fowl." The whole mass is very firm ; the soft tissues cut like cartilage ; they are quite translucent and not calcified at all. They are of a dead white colour. The scalp is partly dissected, showing the bones.

49.9. Extrauterine Foetus.*Hunterian. RR. 379.*

"An extrauterine foetus, small and compressed ; the head, trunk, and upper extremities very distinguishable, but the two lower hanging down like two membranes."

49.10. Extrauterine Foetus, which had ulcerated into the Intestines and out through the Abdominal Wall.*Hunterian. MM. 48.*

The specimen consists of a thick fibrous sac, with the uterus, vagina, bladder, rectum, and a part of the abdominal wall (apparently the umbilicus) attached to it. The sac is cut in several places showing within it the bones of the foetus almost completely macerated. The sac lies behind and above the uterus, attached to it. The right Fallopian tube is lost at once in its wall, the left runs some distance upwards and outwards on it before it likewise gets buried in it. The rectum and sigmoid flexure are recognizable adhering to the left side and back of the sac. Bones have ulcerated into them at two places. On the right side of the sac adhere one or two more coils of intestine. The portion of abdominal wall has been perforated by ulceration. In the hole a bone is

presenting. The bladder, with the ureters and urachus dissected, hangs beside the vagina; the right ureter disappears into the wall of the sac. (In the old catalogue it is said to have been described in *Philosophical Transactions*, but it could not be traced.)

49.11. An Extrauterine Foetus. *Hunterian. MM. 49.*

(No description.) The foetus is very much decomposed; the scalp is torn, showing the cranial bones macerated almost clean. A considerable part of the body and the right leg are wanting.

49.12. Bones of an Extrauterine Foetus. *Hunterian. MM. 50.*

"A number of bones from ditto (an extrauterine foetus) upon a card."

49.13. An Extrauterine Foetus (?). *Jeffray Collection.*

A large foetus greatly crushed together, decomposed, and macerated, the cranial bones projecting through the soft parts. Probably an extrauterine which had lain in a cyst within the abdomen for some time after its death. There is no record of the case.

SECTION II.

DISEASES OF THE DECIDUA, PLACENTA, AND FOETAL MEMBRANES.

(a) *Disease of the Decidua.*

49.14. Hypertrophy of the Decidua. *Hunterian. RR. 220.*

An abortion of considerable size, the bulk being largely due to hypertrophy of the decidua, which is a thick tuberculated membrane. The whole mass is of roughly triangular shape, corresponding to that of the cavity of the uterus. It measures 8 cm. in length by 7 cm. in breadth at the base (*i.e.* the fundus). At the base the decidua is torn, showing the villous chorion.

*(b) Hydatidiform Disease of the Chorion.***49.15. Hydatidiform Degeneration of the Chorion.
(Hydatid Mole.)** *Hunterian. RR. 380.*

"A placenta converted into hydatids, of different sizes and of the shape of a Florence flask; they hang by small threads of different lengths, some from the substance of the placenta, others from neighbouring hydatids." The mass is about as large as a full time placenta. The cysts vary in size from some which are very minute to others which resemble an ordinary yellow grape. Amidst the vesicles there is a considerable mass of fleshy tissue, probably traces of a proper placenta formation, and some membrane resembling a normal chorionic sac; it is unopened. The manner of branching is similar to that seen in normal villi of the chorion. Compare Nos. 49.36 *et seq.*

**49.16. Gravid Uterus "about the Sixth Month," with
Foetus and Placenta, showing partial Hydatidiform
Degeneration of the Chorion.** *Hunterian. RR. 120.*

"An impregnated uterus, laid open, apparently near the sixth month: showing the placenta adhering, and going to be converted into hydatids; at the bottom of the bottle a foetus: on the other side of the uterus there remains a portion of the bladder, showing the opening of the ureters and the beginning of urethra." The foetus and umbilical cord appear perfectly well formed, and the amnion and membranous chorion line the non-placental parts of the interior of the uterus in the normal way. The placenta, however, is unusually large, and through the transparent chorion its mass can be seen to be largely composed of clear vesicles of various sizes, similar to those composing the preceding specimen.

**49.17. An Abortion in the Third Month. Hydatidiform
Degeneration of the Chorion.**

Presented by Dr. Service of Dennistown, 1897.

The following history was given. "Patient had been separated from her husband for five weeks. In the beginning of December they came together again. Yesterday, the ninth of February,

1897, after twelve hours labour, she passed the specimen sent." The conception was believed to date from after the renewal of intercourse. The main mass consists of the sac of the decidua reflexa and serotina, which is clearly recognizable over the greater part of one side and part of one end. This mass is of elongated oval shape, slightly flattened from side to side; it measures 10 by 5 by about 3 cm. From the outside of the placental part hang one large and a number of small hydatids. At the cervical extremity the decidua is torn, and a hernia of the chorion and amnion as large as a walnut (35 by 30 by 30 mm.) projects through the rent. One side of this is covered with a thin layer of decidua. The sac contains a considerable mass of blood clot enclosed between amnion and chorion. On dividing the miscarriage longitudinally (after hardening in spirit), the main mass was found to be almost solid; consisting of placenta (which was largely composed of hydatids) and blood clot. Scarcely any cavity remained, the fluid contents of the chorion and amnion having been squeezed out into the above mentioned hernia. There is a great deal of blood clot, which in the upper part of the specimen lies between the chorion and the decidua and in the substance of the placenta. In the lower protruded part it distinctly lies between the chorion and the amnion. There was no trace of a foetus. The flattened cavity of the ovum is propped open with fine glass rods. The absence of the foetus probably favoured the extrusion of the foetal membranes without rupture by the gradual growth of the degenerating placenta. (MS. Notes, J.H.T., p. 145.)

49.18. Hydatidiform Degeneration of the Chorion.

Hunterian. RR. 382.

A considerable mass of vesicles and fleshy tissue, similar to No. 49.15. The inner surface, as in the preceding specimens, is covered with smooth membranous chorion. Some of the vesicles are very large.

49.19. Hydatidiform Degeneration of the Chorion.

Hunterian. RR. 383.

Similar to the preceding but smaller, and the vesicles smaller and more like "white currants," as commonly described.

49.20. Hydatidiform Degeneration of the Chorion.*Hunterian. RR. 384.***49.21. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 385.***49.22. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 386.***49.23. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 387.***49.24. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 388.***49.25. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 389.***49.26. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 390.***49.27. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 391.***49.28. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 392.***49.29. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 393.***49.30. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 394.*

49.31. Hydatidiform Degeneration of the Chorion.*Hunterian. RR. 395.***49.32. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 397.*

"A considerable hydatid, with some smaller ones growing from its surface, showing mode of formation."

49.33. Hydatidiform Degeneration of the Chorion.*Hunterian. RR. 398.***49.34. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 399.***49.35. Hydatidiform Degeneration of the Chorion.***Hunterian. RR. 400.**(c) Hydramnios.***49.36. Chorion from a Miscarriage. Hydramnios.***Hunterian.*

(Not described; found among the Hunterian specimens.) A chorionic sac about the size of a tennis ball. It hangs by a layer of decidua, which is left covering its upper parts. This decidua is partly split into two layers. The chorion is clear and transparent; over its whole surface it is covered with villi, which are unusually long and branching, and set so far apart that each is quite distinct from its neighbour. The umbilical cord is attached to clear membrane between villi in an area where they are few and far between, there being nowhere any aggregation of them into a placenta. The embryo is about 2 cm. long, and is malformed. There is no distinct amnionic sac surrounding it, as is usual at such an early stage as its size indicates. Apparently amnion and chorion are fused together. This fact and the very abnormally large size of the amnio-chorionic sac in proportion to the embryo seem to indicate a condition of hydramnios. The

embryo and part of the cord have torn away from their attachment and lie on the bottom of the sac.

(d) Disease of the Umbilical Cord.

49.37. Twisting of the Umbilical Cord.

Hunterian.

(Not described.) A foetus, 4.2 cm. long, probably of about 3 months, with its umbilical cord about 12 cm. long, and twisted into a mere thread. It is hung by the placenta, which seems to be imperfectly developed. This condition has been variously interpreted; either as the cause of the death of the foetus by strangling the circulation, or as resulting from the maternal movements acting on a foetus already dead from other causes.

(e) Abortions.

Most of the specimens from No. 49.38 to No. 49.48 are abortions which have been shed immediately or only a short time (at most a few days) after the death of the conception, and before they had undergone degenerative changes. With them should be compared the specimens in the preceding series, illustrating the development of the ovum, Nos. 48.159 to 48.191, which are mostly well-preserved abortions. The history of Nos. 48.168, 48.170, and 48.177a is known. The first and the last were shed within a few hours of a shock, the other was extra-uterine; all three are fresh healthy-looking conceptions. Nos. 49.49 to 49.68 illustrate the conditions found in abortions which have been retained for from some weeks up to several months *in utero* and have undergone various changes, mostly of the nature of degenerations.

49.38. A very Early Abortion. Third or Fourth Week.

From Dr. Allen Thomson's Collection.

It consists of the clear chorionic vesicle, about 1 cm. in diameter, covered with villi—sparsely, except at one part which was already indicated as the future site of the placenta. The embryo is not visible. Such a minute object as this might readily pass unnoticed in a discharge of blood from the uterus, and the miscarriage be regarded as only an unusually profuse menstruation.

49.39. An Abortion early in the Second Month.*Hunterian. RR. 204.*

A chorion considerably larger than the preceding, and very shaggy all over, from an abortion at a somewhat later period—probably fifth or sixth week.

49.40. An Abortion in the Second Month.*Hunterian. RR. 212.*

A chorion about the same size as the preceding. Shows the normal appearance of scanty villi except where the placenta is to be formed.

49.41. An Abortion, probably about Seven Weeks.*Hunterian. RR. 250.*

A somewhat more advanced ovum, with a considerable amount of decidua attached to the outside of the chorion.

49.42. Chorion from an Abortion.*Hunterian. RR. 281.*

A nearly complete chorion somewhat larger than the preceding; very transparent and scantily covered with villi.

49.43. An Abortion, including the Decidua.*Hunterian. RR. 272.*

An irregularly oval mass about the size of a walnut, consisting of the entire ovum and the decidua reflexa. The placental area is readily distinguishable by its roughness. The decidua serotina is torn, showing through the rent the mass of chorionic villi going to the formation of the placenta. Compare Nos. 48.176 and 48.177a, which show the whole of the decidua shed in abortion.

49.44. An Abortion in the Third Month. Decidua.*Hunterian. RR. 253.*

The complete decidual lining of the uterus with the ovum inside it. In shape it is an isosceles triangle, the two sides being rather longer than the base (which corresponds to the fundus uteri, while

the os internum forms the apex). At each corner is a hole, the two upper corresponding to the Fallopian tubes, the lower to the os internum. Behind is seen the placental area with chorionic villi projecting through the decidua serotina. In front the decidua vera is cut to show the cavity of the uterus, and the decidua reflexa enclosing the ovum. The outside of the decidua vera is beset with fine threads—remains of the tubular uterine glands. An unusually perfect specimen, and one which has not undergone changes from long retention in the uterus.

49.45. An Abortion in the Third Month in Section.

Hunterian. RR. 228.

A similar specimen, the decidua vera reflected, and the front of the reflexa and foetal membranes removed, showing the cavity of the ovum; the stump of the umbilical cord ligatured, the embryo gone.

49.46. An Abortion containing an Embryo of about Eight Weeks.

Hunterian. RR. 279.

A similar specimen, but with the decidua vera mostly cut away, and part of the placenta dissected to show the villi of the chorion. The body of the embryo remains, apparently of not more than eight weeks' growth. The time at which it was shed is unknown; William Hunter's opinion was that abortions at three months were mostly of this age, three to four weeks elapsing between the death of the embryo and its extrusion from the uterus. Compare under No. 49.59.

49.47. Decidua from an Abortion.

Hunterian. RR. 285.

A decidua similar to No. 49.45, but a good deal torn and the ovum gone, having in all probability been voided first and the decidua afterwards.

49.48. Decidua from an Abortion.

Hunterian. RR. 286.

A portion of a similar decidua. Thicker and fleshier than the preceding.

49.49. An Abortion. Recent Haemorrhage between the Chorion and the Decidua Reflexa.

Hunterian. RR. 247.

An abortion, consisting of the sac of the decidua reflexa and its contents, has been divided longitudinally, and the half including the embryo and placenta forms the specimen. The embryo appears to be of somewhere between six and eight weeks' growth, and is not deformed. The amnion, which is very large in proportion to the embryo, is attached to the chorion by a distinct stratum of fibrous tissue. The chorion, a slightly thicker white membrane, is covered in its upper part with villi going to the formation of the placenta, its lower part is smooth. The outer surface of the abortion resembles blood clot in some parts, in others it has the characteristic appearance of decidua. The lower (non-placental) part of the space between the chorion and the decidua reflexa is occupied by comparatively recent looking (now dark brown) blood clot, showing at the edges a very slight trace of lamination. It is fully 1.5 cm. thick opposite the os uteri; at this point the blood clot is homogeneous and like recently formed clot. Above this mass of blood clot the amnion and chorion are seen to be separated, and in the space between them there are traces of blood. To judge by the condition of the clot, the abortion was not shed upon the occurrence of the first haemorrhage, yet it was not long retained *in utero*.

49.50. Very Young Abortive Ovum retained some time in the Uterus before Expulsion. *Hunterian. RR. 227.*

"A miscarriage, very young, that had remained some time in the cavity of the uterus before expulsion." A globular mass, part membranous and covered with the characteristic chorionic villi, part solid tissue resembling old thrombus. It is laid open showing the smooth amnion lining the interior. No trace of foetus.

49.51. Very Early Abortion.

Hunterian. RR. 229.

A very young abortive ovum with portions of decidua adhering, mounted on blue paper. Similar to the preceding. Another piece of decidua mounted below.

**49.52. An Abortion. Embryo of about Six Weeks.
Retained some time in the Uterus.***Hunterian. RR. 426.*

(Not described.) It consists of a thick fleshy mass of fibrinous-looking material, part of the chorion covered with villi, some embedded in it, some hanging loose, and the smooth clear amnionic sac with an embryo about 1 cm. long inside it. The embryo appears well formed. From the thickness and density of the solid mass of blood clot the ovum must have lain for some little time in the uterine cavity between the commencement of the hæmorrhage and its expulsion as an abortion.

49.53. An Abortion containing a Minute Ovum.*Hunterian. RR. 271.*

A fleshy fibrinous oval mass, laid open, showing chorionic villi in the wall, and a considerable cavity lined with smooth chorion. Towards the lower part of this is the amnion, about the size of a small pea, in which are distinctly seen the rudiments of the embryo.

**49.54. An Abortion in the Third Month retained in
Utero Two and a half Months.***Presented by Dr. Service of Dennistoun.*

A small oval flattened abortion, measuring about 5 by 3 by 1 cm. The following is the history of the case: "Patient altered 4th April, 1897. Discharge appeared again on 26th June, for a week profusely, and then stopped. Then nothing from beginning of July until now, 17th Sept., 1897. There has been either a miscarriage at the end of June and another now, or this foetus has been dead for the past two months. The woman imagined she was five months pregnant, and said she felt life. R. W. Service." The abortion is certainly not larger than it would be in the third month. It is very firm and nodulated as if old. On section, there is seen to be an abnormally large amount of blood mixed with the tissues of the placenta. The cavity was collapsed, and contained no trace of an embryo. On microscopic examination nearly all the tissues of the membranes and placenta were found to be in a necrosed condition; the intervillous spaces were filled with old dense clot. Clearly the correct interpretation of the history

is that the abortion occurred in June, but that the conception was not thrown out of the uterus, but remained there, practically a dead foreign body, until the 17th of September.

49.55. An Abortion retained some time in the Uterus; a Fleishy Mole. *Hunterian. RR. 221.*

“A miscarriage: the whole being altered from the natural appearance, and its parietes being formed into a dense firm substance, by the extravasation of blood which had coagulated and remained in the uterus for some time.” It is rather larger than a walnut; of ovoid shape, showing a certain amount of the typical triangular form. It is split open, showing walls of dense old blood clot about 1 cm. thick, and a globular cavity lined by a white membrane, the chorion, which encloses a second white membrane, the amnion. The villi of the chorion are not recognizable. Part of the exterior is clearly decidua, though it is much less porous than usual. No embryo. Must have lain in the uterus a considerable time after the death of the product of conception. Compare preceding specimen.

49.56. An Abortion long retained in the Uterus; a Fleishy Mole. *Hunterian. RR. 234.*

“A miscarriage, dead some time before its expulsion from the womb; thickened by coagulated blood, and on the inside tuberculated.” No embryo. Not so thick as the preceding. Compare No. 49.54.

49.57. An Abortion long retained in the Uterus; a Fleishy Mole. *Hunterian. RR. 246.*

“A miscarriage that remained some time in the uterus after it had been dead; become thickened and tuberculated.” The remains of the villi of the chorion are distinctly recognizable in the fleshy wall. There is a deformed embryo about 1.5 cm. long.

49.58. Abortions retained some time in the Uterus.

Hunterian. RR. 248.

Two abortions, somewhat similar to the preceding, but not so much thickened and condensed. The foetal membranes have

a much more natural appearance. Probably not so long retained *in utero*.

49.59. An Abortion long retained in the Uterus.

Hunterian. RR. 257.

"A miscarriage about two months; substance condensed, and recently coagulated blood appearing on the outside." The embryo is about the size of one of two months' growth, but is deformed. The envelope of the conception is very dense, and had evidently lain a long time in the uterus. "A blight occasioning a miscarriage happens about the eighth week of real age, and they are excluded from the uterus commonly about the third month." (William Hunter's *Midwifery Lectures*, MS. R.C.S. Eng., 42, c. 31.)

49.60. An Abortion not long retained in the Uterus.

Hunterian. RR. 258.

A thick mass of comparatively fresh blood clot, with traces of the membranes but no embryo in the cavity. Somewhat similar to No. 49.49.

49.61. An Abortion not long retained in the Uterus.

Hunterian. RR. 259.

Longitudinal section of a comparatively fresh miscarriage. The foetal membranes and chorionic villi are well preserved. A quantity of soft laminated blood clot lies between the chorion and the decidua reflexa. No embryo.

49.62. An Abortion containing a Malformed Embryo.

Hunterian. RR. 260.

Another example of an abortion retained in the uterus long after the death of the embryo. As is often the case, the embryo is malformed: head and body form one smooth mass, with four little formless buds representing the limbs. Compare Series 48, Section III., Development of the Ovum, and Series 50, Monsters.

49.63. An Abortion containing a Malformed Embryo.

Hunterian. RR. 262.

Similar to the preceding. The embryo less malformed.

49.64. An Abortion containing a Malformed Embryo.

Hunterian. RR. 263.

Similar to the preceding. Not so old, the chorionic villi well marked and the membranes generally not so indurated.

49.65. Abortions long retained in the Uterus.

Hunterian. RR. 264.

"Two miscarriages about the sixth month." If the history given in the old catalogue can be relied on, these two products of conception must have been retained *in utero* fully four months after the death of the embryos, which are certainly not of more than eight weeks' growth. Both malformed.

49.66. An Abortion long retained in the Uterus.

Hunterian. RR. 269.

"A miscarriage about seven weeks"; this undoubtedly refers to the probable age of the embryo. Numbers of chorionic villi are recognizable in the thickened membranes. The embryo is malformed.

49.67. A Miscarriage in the Seventh Month. Foetus Dead Two or Three Months.

Presented by Dr. Service of Dennistoun, 1897.

A miscarriage about the size of a foetal head at term. The history of the case as received from Dr. Service is as follows: "Last menstruation, June, 1896. Abortion occurred, January 21, 1897. Dead *in utero* probably three months." The membranes present a fairly healthy appearance. The decidua is moderately thick and fleshy, and presents the usual cribriform appearance. There is no trace of separation of it into two layers, the vera and reflexa having evidently coalesced. The placenta is firm and fleshy; about 1 cm. thick. The membranes are torn at one end of the oval conception, but the foetus is inside. It measures 10 cm. from head to buttocks. It is slightly macerated, the skin being loose and peeling in places. Probably it died in the early part of the fifth month. Microscopic examination of the placenta shows a decadent but not necrosed structure. The epithelial layers of the amnion and chorion are fairly well pre-

served. The villi are well preserved; the fibrous tissue composing them is less cellular and more formed and dense than it would normally be in the fifth month. The blood-vessels are very few and small. The intervillous spaces contain only a little brown debris. The decidua here and there shows infiltration by small round cells. There are traces of necrosis in the decidua and round-celled infiltrations. (MS. Notes, J.H.T., p. 144.)

49.68. Portion of a Placenta forming a Fleishy Mole retained in the Uterus. Subinvolution.

Hunterian. CC. 95.

Formerly described as "an uterus, size of the pregnant at five months, with a very bloody polypus adhering to the fundus; size of one's fist." The polypus is a mass of brown concentrically stratified blood clot, which is firmer externally than internally from the presence of white fibrous threads. Microscopically it consists of blood clot mixed with abundance of necrosed foetal villi—the white threads—cut in various directions. Evidently a portion of a placenta which has remained in the uterus and become buried in blood clot, forming a so-called haematoma, placental polypus, or fleshy mole. (MS. Notes, J.H.T., p. 125.)

49.69. Interior of the Uterus after an Abortion about the Third Month. —

An uterus, from its size probably early in the third month of gestation, laid open, showing a rough surface studded with lumps like blood clot where the ovum had been attached. The rest of the mucous membrane seems to have a raw surface, but not to the extent of exposing the muscular fibres. The cavity of the uterus is considerably enlarged and the cervix dilated. No history.

(f) *Malpositions of the Ovum in the Uterus;*
Placenta Praevia.

49.70. Attachment of the Ovum in the Lower Segment of the Uterus.

Hunterian. RR. 278.

"A miscarriage near three months," including the whole decidua. The abortion is of the usual triangular shape; it is hung by the

cervical end. The decidua vera, and within it the decidua reflexa, are slit open showing the placenta with the stump of the cord. It is attached to the side of the uterus well down towards the cervix, its lower edge overlapping the os. The neck of the decidua vera is occupied by a mass of soft blood clot. This condition in a later stage of development might have been a placenta praevia. Compare No. 49.73.

49.71. Attachment of the Ovum over the Os Uteri.

Hunterian. RR. 219.

Decidua containing an ovum, probably not more than eight weeks old, opened, and the anterior lamina turned down showing the globular chorionic sac occupying the lower segment of the uterus. Through the transparent membranes a mass is visible right over the os, which seems to be the developing placenta. Above the chorionic vesicle is seen the characteristic triangular decidua with the orifices of the Fallopian tubes at the corners.

49.72. Implantation of the Ovum over the Os Uteri.

Hunterian. RR. —.

A section of a similar conception, but considerably younger. Not described in the old catalogue. It appears to correspond to fig. 4 of Pl. XXXIV. of Hunter's *Gravid Uterus*, but not exactly. Probably this is the other half of the conception, and that from which the plate was made has been lost. It is described (under fig. 3) as "supposed to be of the fourth week." The villi are visible all over the chorion, but seem to be more developed on the upper surface, *i.e.* away from the os. The globular ovum occupies the lower third of the decidua; the upper parts present the usual triangular shape, the angles corresponding to the entrances of the Fallopian tubes.

49.73. Placenta Praevia.

Hunterian. RR. 121.

"A section of an uterus, with placenta detached from the os tincae, to which it had adhered; it had probably been separated by the dilatation of cervix and os uteri during labour, occasioning a rupture of vessels and haemorrhage, which is frequently, and was most likely in this case, fatal." Shows what would probably have been the result in the three preceding cases, had they been retained

till the placenta was formed. William Hunter's opinion was as follows: "There are two things at the time of labour which I am frightened at (all the others I don't care a sixpence for); one is a flooding, and the other convulsions. Flooding, when the woman is not in labour, or in the time when it is not over, is a very alarming symptom, as it indicates a very considerable separation, and there is no chance of its being worn off till the uterus is emptied. It generally proceeds from the placenta adhering too near the os tincae, and in such case I think it is always of great weight to hasten the delivery by breaking the membranes and trying to bring it away by the feet." (*Midwifery Lectures*, MS. R.C.S.Eng., 42, c. 31.) This specimen closely resembles, and probably is the original of the lower part of Pl. XII. of the *Gravid Uterus*, which was taken from the uterus of a woman "who died of a flooding in the ninth month of pregnancy." The placenta is not attached right over the os, but chiefly on the anterior wall, overlapping the os only a few centimetres—a position decidedly favourable to success in introducing the fingers to turn and bring down the foot.

SECTION III.

INJURIES AND DISEASES OF THE UTERUS AND APPENDAGES AND EXTERNAL GENITAL ORGANS COMPLICATING PREGNANCY AND PARTURITION.

I. CONGENITAL DEFECTS AND MALFORMATIONS.

Specimens wanted.

II. INJURIES OF THE GENITAL ORGANS DURING PARTURITION.

49.74. Rupture of the Perinaeum. *Hunterian. RR. 420.*

(Not described.) The vulva and perinaeum of a young woman, showing a rupture extending about halfway to the anus.

49.75. Rupture of the Uterus and Placenta Praevia.

Hunterian. RR. 92.

"A section of an uterus, where may be seen immediately above the os tincae a rupture two inches in length; the placenta had been

adhering over the os tincae, and there is the appearance still of there having been considerable hæmorrhage ;” (not distinguishable now, the specimen being completely blanched by the spirit). The rupture extends completely through the muscular wall, but the peritoneum is unbroken. The placenta has been raised up ; it was situated to one side but overlapping the os.

III. ABNORMALITIES OF THE WALLS OF THE PREGNANT UTERUS DUE TO ALTERATIONS IN NUTRITION.

49.76. Hypertrophy of the Muscular Wall of the Gravid Uterus.

Hunterian. RR. 129.

“A longitudinal section of uterus, appearing thicker and denser in its substance than the gravid uterus commonly is ; the vessels also upon the whole are considerably smaller and fewer in number than they are generally met with ; upon the inside the decidua is adhering, in some parts hanging down ragged.”

IV. INFLAMMATORY DISEASES COMPLICATING PREGNANCY AND PARTURITION.

Specimens wanted.

V. TUMOURS COMPLICATING PREGNANCY AND PARTURITION.

49.77. Small Myoma of the Gravid Uterus.

Hunterian. RR. 104.

“A half of an uterus not at full time, where on the outside may be seen a small rounded tumour near the origin of one of the Fallopian tubes ; on the inside the membranes partly adhering, the cervix uteri not at all enlarged, and at the os tincae a cluster of follicles filled with jelly, giving an irregularity to the surface of os tincae.”

49.78. Small Myoma of the Gravid Uterus.

Hunterian. RR. 115.

“A section of an uterus, most probably the same with No. 104, showing on the outside a tumour apparently scirrhus ;

and on the inside the membranes reaching down only as far as the cervix uteri, and the os tincae studded with follicles full of jelly." In the old catalogue the term scirrhus is frequently applied to myomata.

49.79. Myoma near the Cervix of the Gravid Uterus.

Hunterian. RR. 185.

"One half of a gravid uterus, with decidua adhering; and at the side, not far from the cervix uteri, a rounded scirrhus mass, which might impede the full contraction of the uterus." Also it might interfere with the descent of the foetal head in labour.

49.80. Myoma near the Cervix of the Gravid Uterus.

Hunterian. RR. 186.

"The other half of the preceding, the inner surface of the uterus very ragged."

49.81. Softening Myoma in the Gravid Uterus.

Hunterian. RR. 376.

"A section of a gravid uterus, showing a cavity containing a scrophulous kind of a matter," which on careful examination is seen to be a softening myoma. Such a condition as this might, by weakening a portion of the uterine wall, lead to rupture of the uterus during labour.

49.82. Softening Myoma in the Gravid Uterus.

Hunterian. RR. 377.

"Another section of the same, showing the same."

SERIES 50.

MONSTERS.

DOUBLE MONSTERS,	1-51
<i>Anterior Duplicity (Diprosopus and Dicephalus),</i>	1-10
<i>Posterior Duplicity (Dipygus and Syncephalus),</i>	11-37
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ACARDIAC MONSTERS,	45-51
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<i>Dwarfing,</i>	—
<i>Malformations of the Limbs (Symmelus, Peromelus, etc.),</i>	52-61
<i>Cyclopia and Allied Deformities,</i>	62-75
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In this series are placed all those grave malformations which affect the whole body or one or more of its important organs to an extent which would seriously interfere with independent existence. Minor malformations affecting only one region or organ are mostly placed in the series illustrative of the diseases of the particular organs or systems. The classification and nomenclature which has in the main been followed is that of Förster, as being the most practical. Förster's names are generally

used in the titles, but in addition those employed by Isidore Geoffroy St. Hilaire are given in parentheses at the beginning of the descriptions in order to facilitate reference to the *Traité de Teratologie* and to *Production Artificielle des Monstrosités* of M. Camille Dareste, to which latter work the author of the catalogue is very deeply indebted. As to William Hunter's views regarding monstrosities, he says in his lectures, "Winslow's and Duverney's notion was that a great number of what are called monsters were so formed from their first origin as if God Almighty intended those to be monsters as much as he does that others should not. Now, Gentlemen, I find that I know so little about it that it is extremely improper to give my opinion, but, however, from what I have seen I am of Winslow's mind."

DIVISION I.

DOUBLE MONSTERS (DOPPELMISBILDUNGEN, Förster : DIPLOGENESES, Dareste).

This comprises all monstrosities resulting from twin conception, and therefore includes acephalic, acormic, and anidian monsters. It is now regarded as beyond dispute that certain cases of twins and all double monstrosities arise from two centres of embryonic formation on a single cicatricula. According to the degree to which these centres come to overlap one another in the process of cell-division to form the blastoderm and the manner in which they fuse together will be the degree and kind of duplicity in the developed monstrosity. The origin of double monstrosities being determined at such an early period in the life of the embryo, reference to the old question of whether they arise by fission of a primitively single embryo or union of two primitively separate embryos is unnecessary in describing monsters already fully formed. Accordingly the terms union, fusion, division, and bifurcation are used as may be most convenient for purposes of description without implying any reference to any theory of the origin of double monsters. In accordance with the opinions of Förster, and of M. Dareste and of Professor Cleland, those monstrosities which, under I. Geoffroy St. Hilaire's classification, would have appeared as a separate order (*Monstres Parasitaires*) are no longer kept apart, but are catalogued along with the rest of the double monstrosities according to their affinities towards

the more perfectly formed monsters, *e.g.* the specimens of appended hind limbs are placed at the beginning of the *Terata Anadidyma* as examples of *duplicitas posterior*.

(a) *Terata Katadidyma. Monstrosities by Duplicity of the Anterior (or Superior) Parts.*

50.1. Chicken with Doubling of Upper Part of Beak.

Hunterian.

The specimen is a newly hatched chicken. The lower jaw (mandible) presents the normal appearance. The upper jaw (maxilla) is divided into two widely diverging processes. Each of these appears to be a complete, but not quite perfectly developed, upper jaw. Their external sides are twisted, but otherwise perfectly formed. On the internal sides the basal part of the horny beak is very small, suggesting that the condition is really only a splitting of a single beak; but, on the other hand, the point of each process is a perfectly formed beak; each has a pair of nares with a pair of nostrils below them, and the palate in each is fully formed as in a properly developed animal, consisting of two lateral parts and a median septum; and there are two openings of posterior nares separated by the septa at the back of each process. There is no trace of an eye between the beaks. It is about the least possible degree of anterior duplicity. Compare No. 50.15.

50.2. *Diprosopus Triophthalmus*. Pig. *Hunterian*. MM. 37.

(Opodyme.) The anterior parts of a pig "at the full time," comprising the forelegs, thorax, and neck, bearing two heads united by the adjacent surfaces of the crania. The angle between the two snouts is an acute one. The right head is larger and better formed than the left, of which "the under jaw is wanting." The snouts are separate back to about the position of the eyes, beyond which point the two heads are completely fused. There are two frontal bones, four parietal bones (the inner two fused together), and a single occipital bone which is abnormally broad. The vertebral column is quite single. The eyes on the outer sides appear normal. The third, placed in the angle between the two faces, is single, but the eyelids

give evidence of their double origin by forming a quadrilateral aperture (compare Cyclopians). The larger head (right) has perfectly formed oesophagus, larynx, and trachea; the other, besides having no lower jaw, has neither oesophagus nor air passages. A small orifice in front of the left ear of the left head, marked by a piece of whale-bone, is probably the remains of the second branchial cleft. "The carotids are injected, the left, as going to the supernumerary head as well as to the left side of the right one, is largest." The branches to the left head come off about the same level as the bifurcation into external and internal carotid for the right head. There is no description of heart and lungs, but doubtless they were normal. The duplication is limited to the head.

50.3. *Diprosopus Tetrophthalmus*. Kitten.

Presented by Professor Young, 1897.

(Opodyme.) A new-born male kitten, illustrating the above, not dissected. The two heads are united laterally, the faces diverging from one another at a fairly acute angle. The cranium is apparently single in the occipital region, but it widens out immediately in front, being clearly double in the parietal region. There are only two ears, placed on the outer sides of the heads. There are four eyes, which are of course closed. The two inner almost meet at their adjacent corners. The upper jaws, noses, and outside lower jaws are well formed; the inner lower jaws are short and undersized.

50.4. *Diprosopus Triotus*. Sheep.

Hunterian (?).

(Opodyme.) The skull, all the cervical and the first dorsal vertebrae, and first pair of ribs of a full grown sheep; most of the soft parts dissected off, and the specimen dried and varnished. The arteries have been injected red, the veins blue, and the larger blood-vessels and the larynx, trachea, oesophagus, and tongue have been carefully dissected and preserved. There are two heads united by their posterior regions, the anterior parts diverging at a very wide angle. The vertebral column is single. The occipital bone also gives no distinct evidence of duplicity. All the other parts of the skull are more or less doubled. There are four completely distinct and separate orbits. Part of the

cranial vault has been removed, showing that there were two distinct cerebra and a single cerebellum. The cerebral fossae are separated posteriorly by the cerebellar fossa. Anteriorly this fossa is bounded on each outer side by a well-formed half of a tentorium cerebelli; towards the middle by two membranous edges which unite anteriorly into a single membranous septum, which is clearly the coalesced adjacent halves of two tentoria cerebelli. From the duplicity here revealed it seems probable that there was some duplication about the cerebellum, pons, and perhaps medulla oblongata. The spinal cord has clearly been single. There are two well-formed temporal bones, left of the left head and right of the right head, corresponding to two external meatus on the outer sides of the heads. In front of the cerebellar fossa, in the base of the membranous septum described above, there are two large foramina, probably for two facial and auditory nerves. The corresponding temporal bones are intimately fused together, with distinct evidence of their original duplicity remaining. There are two zygomata united at their origins, but diverging to two distinct malar bones; in the angle of divergence there is a single meatus auditorius externus. The exact condition of the internal auditory organs cannot be determined owing to the soft parts dried over them, but from the condition in the bones it is probable that they were double; compare next specimen. The upper jaws are quite distinct. The palate is cleft in both. The lower jaws are also quite distinct. The adjacent ones are rotated and the angles bent outwards (relatively to their respective heads) in such a way that, while they are set end to end, the parts in apposition are the inner sides of the angles. There are two distinct condyles and necks, with the single meatus auditorius externus emerging between them. There are two distinct buccal cavities in front, which fuse behind into a single one with single pharynx and oesophagus. There are two tongues united at their bases, a single epiglottis, and single larynx and trachea. There have been three carotid arteries—two lateral and a median; they are imperfectly preserved.

50.4a. Diprosopus Triotus. Calf.

Presented by Professor Young.

Skull of a young calf, macerated, dried, and articulated. The condition is identical with that in the preceding specimen—two

crania fused together by their back parts exactly as described above. The soft parts being all removed the condition of the adjacent temporal bones appears more clearly than in the preceding ; there are two external auditory bony meatus set close together, but quite separate, and also separate internal meatus ; it is possible, therefore, that both this and the preceding would be more correctly described as *Diprosopus Tetrotus*.

50.5. *Diprosopus Tetrotus*. Calf.

From Dr. Allen Thomson's Collection.

(*Iniodyme*). The anterior half of a double-headed monstrosity in a foetal calf, injected red, and the thorax, throat, and back of neck dissected. The two heads are united by soft parts and by the adjacent sides of the occipital bones. The union is not very firm ; whether it is or is not osseous could hardly be ascertained without spoiling the specimen. There are two foramina magna. The atlas is single but very broad. In the angle between the two heads are two ears, pressed close together, but perfectly well formed and distinct from one another. The two heads are thus practically distinct. In front the doubling is seen in the larynx and carotid arteries. The heart is single. There are three carotids arising from the aorta by a common trunk—two smaller lateral ones correspond to the right of the right head and the left of the left head, the third is a large median vessel which runs up in front of the trachea, crosses over the bifurcation of the thyroid cartilage (see below), and divides to supply the adjacent sides of the heads. The trachea and oesophagus are single. The larynx consists of one cricoid cartilage, above which is a triangular cartilage compounded of two thyroid cartilages. This cartilage is broad and flat on the top ; the sides diverge widely from the cricoid cartilage upwards ; it has a single opening below, and two above which point nearly at right angles to the lower one. There are two hyoid bones distinct and at some distance from one another. There are two pharynges. There are two thyroid glands which are not united across the trachea, but send processes over the divergent upper parts of the compound thyroid cartilage, which appear to meet behind it. The thymus (which has been removed) extended from the thorax right up over the top of the larynx and some little way down behind it.

50.6. Diprosopus Tetrotus. Chick.*Hunterian.*

(Iniodyme.) A chick about the period of hatching, having two heads fused together by the adjacent halves of the occipital bones. The foramina magna are quite distinct, though close together. The atlas is single; its posterior arch is complete, but from immediately below it to the dorsal region there is a condition of complete spina bifida. In front, in the angle between the two heads, are two ears, close together but quite distinct. There are two separate tracheae and oesophagi. The former appear not to unite at all, but run to different lungs; the latter are not exposed to their terminations. The heart is single.

50.7. Dicephalus. Snake with Two Heads.

(Derodyme?.) The two heads and the vertebral columns for a short distance are quite distinct, and equally well formed. Union by the soft parts commences just behind the heads. Not dissected.

50.8. Dicephalus Diauchenus. Human.*Hunterian.*

(Derodyme.) A female foetus of about six months, with two heads set on a very broad neck, which is bifurcated only at the very top. The duplicity of the cervical vertebrae is distinct for some distance after the soft parts have united. The left head is much smaller than the right; it presents a large posterior hernia cerebri (encephalocele). The right head has a cleft palate and hare-lip. There are two arms, which are equally well developed. Not dissected.

50.9. Dicephalus Diauchenus. Human.*Hunterian.*

(Derodyme.) A full-grown male foetus with two heads, of equal size and well formed, set on two distinct necks. The duplicity of the vertebral columns, to judge by the spinal processes, extends to the lower dorsal region. The thorax in front appears single; a cut has been made into it, through which the heart is seen to be completely single so far as the ventricular portion is concerned, but the arteries rising from the right ventricle go to the right head, and those rising from the left ventricle to the left head. No description in the old catalogue.

50.10. Dicephalus Tetrabrachius. Fallow Deer.*Hunterian (?)*

(Xiphodyme.) A stuffed monstrosity of the fallow deer. There are two heads, four well-formed fore legs, two thoraces, and a single pelvis with a pair of hind legs. The heads face one another, and the thoraces are more or less face to face, but turned slightly obliquely in consequence of the vertebral columns passing to one side towards their point of union, which is at the side relatively to the skulls and thoraces. The pelvis and lumbar portion of the vertebral column are single; the hind legs point at right angles to the fore legs. The bifurcation of the vertebral column is at a wide angle; it takes place in the lower dorsal region. The fusion involves the whole abdomen, and extends to a point which makes it appear probable that the lower costal arches and ends of the sterna were united as in the type named by Isidore Geoffroy St. Hilaire "Xiphodyme," that is to say, by the xiphoid processes only. In the present condition of the specimen the exact nature of the fusion cannot be determined.

(b) *Duplicity of the Inferior (or Posterior) Parts. Terata Anadidyma. Monstres Monocephaliens et Syncephaliens.*

50.11. Chick with Additional Hind Limb.*From Dr. Allen Thomson's Collection.*

(Ileadelphe : Etienne Geoffroy St. Hilaire. Pygomèle : Isidore Geoffroy St. Hilaire. Ileadelphe : Dareste.) The chick, a Dorking, which is said to have lived for a week, is well formed except that it has an additional median hind limb which has two feet. The feathers have been removed from the hinder parts and a partial dissection done. The right and left limbs and the ossa innominata appear normal. There is one sacrum, one tail, and two cloacal orifices. There is one large cloacal sac which opens by the left anus under the coccyx, and it is traceable up to the right anus but ends blindly there; it thus shows traces of duplicity. The tail is turned up to the left, overlapping the left innominate bone, and making an abnormally wide angle with the right one. In this angle, with a cloacal orifice on either side of it, the extra limb is attached by ligaments and muscles. There is no extra pelvic bone. The femoral and tibial elements of the extra limb are single; the first

part of the tarsus is also single, but ends in a broad head with which are articulated two tarso-metatarsal bones and feet. The feet have only three digits apiece, the inner rudimentary toes of both being absent. The feet are a right and a left, and they are turned so as to make the soles look forwards. At the articulation the metacarpals are in apposition by their inner sides, but a little below it they cross, and the outer sides of the feet are thus brought into apposition. The nature of the extra limb is difficult to make out from this specimen alone, but comparison of it with Professor Cleland's descriptions (*Proceedings of the Philosophical Society of Glasgow*, 1885 86, Vol. XVII.), and with the next specimen, and consideration of the position of the two cloacal orifices, prove that it is a compound of the two adjacent limbs of two different pelves, the inner parts of which have been suppressed or never formed. The monstrosity therefore belongs to the class dipygus, or duplicity of the posterior end of the body.

50.12. Dipygus Dibrachius. Chick.

Presented by Professor J. B. Cowan, 1869.

(Thoradelphæ.) A chick with four legs, two tails, two sacral bones, two cloacal apertures, and the normal number of wings. In this specimen the doubling of the pelvis is distinct though incomplete, and the additional pair of hind limbs clearly belong to different pelves. They are turned backwards in the direction which is outwards relative to the long axes of their respective pelves, so as to unite by their inner and anterior surfaces, and so that their joints bend in the reverse direction, the soles looking forwards. They appear well formed, and the bones are all separate; the anterior soft parts are fused, and the inner digits of the feet are together. The two outer and the right supernumerary feet have only one of the rudimentary inner toes, but the left supernumerary foot has two as in the Dorking breed of fowls.

50.13. Lamb with Additional Hind Limbs. Dipygus Dibrachius.

Hunterian (?).

(Ileadelphæ: Dareste.) A stuffed lamb with four hind legs. The two inner legs have the appearance of appended legs; they are placed considerably in the rear of the two outer, which in these cases are generally the ones that the animal uses. In this case,

however, all four limbs are fairly well developed ; and whereas the outer leg of the left pelvis is better developed than the median, the median leg of the right pelvis is better developed than the outer one. There is only one tail, which is directed if anything to the right. Close under and rather to the right of the tail is an anus, and a second anus lies about 1.5 cm. to the left of the tail. From these two anuses diverge two smooth-skinned raphes leading to two sets of male external genitals, which lie at some distance from one another, between the outer leg and adjacent appended leg on either side. There is no reversing of the extra legs, which are clearly the left leg of the right pelvis and the right leg of the left pelvis. The condition of the pelvic bones cannot be made out in the present condition of the specimen.

50. 14. Dipygus Dibrachius. Kitten. *Hunterian. MM. 28.*

(Thoradelphæ.) "A kitten (female) with a single head, brain wanting, mouth and nose imperforated. Body double, contents of chest single, of pelvis double; body only becomes double below diaphragm." The distinctness of the two pelves and the singleness of the thorax are absolutely perfect. The head shows the conditions of anencephalia, agnathia, and cyclopia; the most striking object about it is the large and prominent eyeball; it is compounded of two eyeballs fused together, and it protrudes from a wide circle of compound eyelid on the summit of the head. There is about two-thirds of each globe in the compound eyeball; the two corneae are quite distinct. A rounded hairy knob below the eye represents the upper maxillary processes; there is a trace of a mouth on its under side; no trace of olfactory organ or lower jaw; the ears are fused across the front of the throat. (Opocephalæ.)

50. 15. Dipygus Dibrachius. Pig. *Hunterian (?).*

(Thoradelphæ.) Montrosity of pig stuffed. It has one head, one thorax with single pair of fore limbs, abdomen double from the umbilicus, two distinct pelves, and four hind limbs. The lower jaw is also double, showing four distinct rows of teeth in front. The inner sides of the two mandibles are fused. The tongue is also double, and the pharynx is divided by a narrow septum. No other evidence of

anterior duplicity. The condition is an approach to that described as rhachipagus—anterior and posterior duplicity with singleness in the middle (*vide* No. 50.43), but the anterior duplicity was so slight that it seemed more appropriately placed along with the dipygus, which in other respects it so closely resembles.

The succeeding Twenty-one Monstrosities, belonging to three genera of Förster, *Dipygus tetrabrachius*, *Synecephalus*, and *Prosopo-thoracopagus*, form a regular series in which the degree of duplicity gradually increases; but the fusion, while differing in degree, is similar in nature. The preceding genus, dipygus dibrachius, is characterized by the presence of two hinder portions placed side by side and vertebral column becoming single below the dorsal region, so that all above the umbilicus is single. In the present set of monstrosities the vertebral columns are distinct—in the lowest form up to the cervical region, in the middle form up to the occiput, and in the highest there is more or less duplicity of the cranium and face also. The common features of all grades are: (1) the face-to-face position of the bodies, (2) the formation of a single thoracic cavity, the parietes of which have a double origin. According to Dareste the origin of these monstrosities is as follows: They arise from the overlapping of two centres of embryonic formation on one blastoderm. These are in contact by the cephalic ends, and according to the degree of fusion of the two head folds the head is single or more or less double. The amnionic folds of the two embryos are united anteriorly, and this union extends into the lateral folds from before backwards, so that, instead of two lateral folds of each embryo uniting with one another to form a single thorax in the normal way, each unites with the opposite one of the other embryo, a right with a left and a left with a right, producing two breast surfaces with ribs and sterna to right and left of the vertebral columns, each belonging by half to both embryos. In this way a single thoracic cavity is produced which has two back surfaces corresponding to the two vertebral columns, and two breast surfaces placed laterally to them, each belonging by half to each vertebral column. Where the head is single it faces in the direction of one of the breast surfaces and at right angles to the sagittal axis of the two pelves. Where there are two faces, as in the janiceps, they look opposite ways, in the direction of the two breast surfaces. Specimen No. 50.23 shows the skeleton of such a thorax.

The arrangement of the abdominal and thoracic viscera varies with the degree of duplicity, but all present the common features of the oesophagus, stomach, and intestine being single down to the point at which the single vitelline duct passes off to the single umbilicus; all below that double. In the lower degrees of duplicity (dipygus tetrabrachius) the thoracic viscera are single. In the higher (syncephalus and prosopo-thoracopagus) they are double—two hearts, four lungs, two tracheae, and the oesophagus (single) running down the centre; each heart belongs by half to both embryos. The two hearts lie on the plane of union under the two sterna, and the lungs at the sides of each belong to different animals. The thoracic viscera are symmetrical across the plane of union as well as bilaterally. (*Résumé of Production Artificielle des Monstrosités*, Camille Dareste, Paris, 1895, p. 512.)

50. 16. Dipygus Tetrabrachius. Chick.

This and the two following specimens show the lowest degree of the form of duplicity described in the introduction to this part of the series. They form a bridge between the preceding dipygus dibrachius (thoradelphé) and the first of the three allied genera—the dipygus tetrabrachius or deradelphé of Isidore Geoffroy St. Hilaire. In this monstrosity of the chick the doubling of the pelvis is complete, of the thoracic parietes incomplete. The union occurring to a certain extent laterally produces a degree of suppression of the sternum and ribs corresponding to the two hinder wings; compare succeeding specimen. The two vertebral columns unite at the root of the neck, and the neck and head are single. The two exterior (anterior as regards the head) wings are well formed; the two inner (posterior as regards the head)—right of left and left of right thorax—are crushed together, and, while remaining distinct, are dwarfed; they articulate by separate shoulder joints on the opposite sides of a common shoulder girdle of very small size. The thoracic cavity and heart are single; the liver and lower parts of the intestines double. From the point of union of the vertebral columns to the base of the skull there is complete open spina bifida. The medullary groove has never closed, and the spinal canal appears as a flat-floored gutter about 3 mm. wide, bordered on either side by a row of minute cartilaginous processes representing the arches.

50.17. Dipygus Tribrachius. Kitten. *Hunterian. MM. 65.*

(Deradelphie.) Female. Described formerly as a "kind of double kitten, where the head is single and two bodies joined together at the spine; there are four hinder legs, and only three fore legs, one of which is small, crooked, and placed in the middle of the back." The nature of the fusion is exactly the same as in the preceding chicken, but goes a little further in the fore limbs.

The vertebral columns join in the upper dorsal region; the whole cervical region is completely single; cervical vertebrae and head are well formed. Fusion of the bodies extends down to the common umbilicus. The posterior arm is articulated just below the point of fusion of the vertebral columns. It consists of a paw, forearm, and a rounded cartilaginous socket attached by muscles and ligaments to the skeleton. The paw has only the usual number of digits (five), but its double origin is shown by the perfect bilateral symmetry in the outer ones, both of which present the characters of fifth toes, and by the presence of two carpal tubercles. These two points indicate that the limb contains the elements of two fore limbs united by their inner (or, taking the embryonic position, anterior) borders, just as in the preceding specimen. Below this limb is a breast surface smaller than that in front, but constituted as described in the introduction to the section, viz. one half of the sternum and ribs belongs to each vertebral column. It was partly dissected for examination, and the skin afterwards replaced. Compare succeeding dipygus tetrabrachius and syncephalus.

50.18. Dipygus Tribrachius. Kitten. *Hunterian. MM. 65a.*

(Deradelphie.) The specimen is similar to the preceding in every respect, except that there is a deformity of the nose and mouth. The lower jaw and tongue are cleft, and the two superior maxillary and the intermediate processes are separated. These processes, further back, are united by soft tissues, completely shutting off the mouth from the pharynx. Female.

50.19. Dipygus Tetrabrachius Synbrachius. Fallow Deer.

Hunterian.

(Deradelphie.) A monstrosity of the fallow deer stuffed. The manner of union is similar to that in the preceding kittens, but

the posterior two forelegs are not completely fused into one limb. They are united by their inner surfaces, and rolled outwards so that the toes point away from one another. Forms a link between the preceding and the dipygus tetrabrachius.

50.20. Dipygus Tetrabrachius. Kitten.

(Deradelphe.) A kitten with one head, two separate hind quarters, and four distinct fore legs; male. This and the seven succeeding specimens, all belonging to the same genus, complete the bridge between the dipygus dibrachius and the syncephalus. As in the former, the head is single (showing traces of doubling only in the occipital bone); while, as in the latter, the vertebral columns are completely distinct, and the thoraces are united to form a single cavity with two breast surfaces looking forwards and backwards and belonging by halves to each body. The union of the anterior surfaces extends down to a common umbilicus. This specimen shows the general outward characters; No. 22 is skinned and partially dissected to show the arrangement of the vertebral columns and partly doubled occipital bones; and No. 21 shows the two breast surfaces of the thorax and the single heart placed under the front sternum. No. 23 shows the base of the skull and the skeleton of the thorax.

50.21. Dipygus Tetrabrachius. Kitten.

From Dr. Allen Thomson's Collection.

(Deradelphe.) Similar to the preceding. The skin and pectoral muscles have been divided and turned aside from both breast surfaces. The two sterna are split: under the front one lies a well-formed heart; under the posterior one were found the lungs and no trace of a second heart. Contrast the Syncephalic monsters, Nos. 50.32 *et seq.*

50.22. Dipygus Tetrabrachius. Kitten.

(Deradelphe.) A similar monstrosity; female. It is skinned and the neck dissected, showing that the vertebral columns are distinct up to the occiput. The occipital protuberance and the whole head in front of it is single. Evidence of doubling is

seen in the unusual width of the base of the head articulating with the two atlases, but the exact arrangement is not seen in this specimen.

50.23. Skeleton of *Dipygus Tetrabrachius*. Kitten.

The skull, thorax, and portions of the vertebral column of a similar monstrosity in a kitten (*deradelphic*); male; dissected, and the skull partially separated from the vertebral columns. The occipital region of the skull shows two foramina magna separated by a bridge of bone 3 or 4 mm. broad, and two complete sets of articular surfaces. The larynx and oesophagus, hanging from it in front, are seen to be single. The skeleton of the necks and thorax, partially dissected, hangs in the natural position below the head, showing the two atlases corresponding to the two sets of articular processes on the occiput; also the manner in which the single-chambered thorax is constituted. The thoracic viscera are single. The diaphragm, like the parietes of the thorax, gives evidence of its double origin. Posteriorly there is a triangular gap extending from the oesophagus to the posterior sternum and costal cartilages, in which it is incomplete. The oesophagus comes down behind the liver into a single stomach. The liver is large but apparently single, situated to the front of the abdomen and mostly to the right side (relative to the head). There is only one bile duct. The falciform ligament is single, and is continued downwards to the single umbilicus. The small intestine is single for a length of 21 cm., then becomes double for other 3 cm. further on both sides before joining the great intestines. Close above the point of bifurcation of the small intestine there is a single diverticulum, about 3 cm. long, attached by a short thin pedicle to the umbilicus, representing the remains of the vitelline duct. The great intestines and entire genito-urinary apparatus are double.

50.24. *Dipygus Tetrabrachius*. Sheep.

Hunterian.

(*Deradelphic*.) A monstrosity similar to the preceding in a very young male foetal sheep. The posterior part of the cranium is membranous. In this specimen the pelvic extremities face one another very fairly, their transverse axes parallel to the sagittal plane of the head.

50. 25. Dipygus Tetrabrachius. Chick. *Jeffray Collection.*

(Deradelphie.) Monstrosity of chicken similar to the preceding in kittens and sheep. The specimen had been allowed to dry, which is rather an advantage in that it allows the bones to be clearly seen. The manner in which the bodies are united by their anterior surfaces, the constitution of the two breast surfaces, and the distinctness of the vertebral columns and partial duplicity of the occiput are clearly recognizable as identical with the characters described in the preceding mammalian monsters.

50. 26. Dipygus Tetrabrachius. Chick. *Hunterian. MM. 44.*

Similar to the preceding.

50. 27. Dipygus Tetrabrachius. Chick. *Jeffray Collection.*

Similar to the preceding. The upper part of the cranium is defective (hemicrania), and the upper jaw is short and twisted to the left in consequence of imperfect development on that side.

50. 28. Kitten with Four Anterior Parasitic Limbs. Dipygus Tetrabrachius Parasiticus.

Hunterian. MM. 64.

(Deradelphie with one animal imperfectly developed, or heteradelphie.) The monstrosity, which is of the female sex and apparently new-born, was formerly described as "a kind of double kitten, where the one is complete, and the hinder parts of the other are joined to the belly of the former, and at the same time showing a junction of what are to be considered as the fore legs." The parasitic parts are an anterior division consisting of two fore legs, and a posterior division consisting of a pair of hind legs, between which are an anus, external genitals, and a little tubercle representing the tail. The two divisions were connected by a fleshy ridge about the thickness of a lead pencil. The monster has been partly skinned and dissected to show the relations of parts. The anterior division of the parasite shows no trace of vertebral column or shoulder girdle; it consists solely of two fore limbs, of which the upper arms are united by the soft parts of their posterior surfaces down to the elbows, and the fore arms and paws, being flexed to a right angle to the upper arms in the natural direction, lie pointing

away from one another almost in a straight line. The paws have only four claws each, but the presence of the little tubercle which is situated on the ulnar side of the carpus, and the shape of the paws show that the dew-claws (corresponding to the thumbs) are the digits which are wanting, and that the limbs are a left one, which is towards the right side, and a right one, which is towards the left side of the developed twin. The head of the parasitic left humerus disappears under the shoulder joint of the right fore limb of the well-formed animal. Its biceps muscle partly decussates with that of the well-formed right limb, partly passes on to be attached to the acromion process of the right scapula. The parasitic right fore limb is attached by ligaments and muscles to the other parasitic fore limb, and to the right side of the neck of the animal nearer the head. Muscles pass from it to the right scapula and to the right mastoid region of the head. On dissection the fleshy ridge uniting the anterior part of the parasite to the posterior part was found to consist merely of skin and adipose tissue, on the removal of which a narrow quadrilateral opening into the cavity of the thorax was revealed. This space is bounded below by the upper surface of the posterior division of the parasite, above by the under surface of the anterior division, and on either side by the edge of a breast surface. These two breast surfaces consist each of a single set of ribs and a sternum, or rather a half sternum. That on the right belongs to the right fore limb of the developed twin, and from it arise the pectoral muscles of the said right fore limb and of the neighbouring parasitic left fore leg. The other belongs to the left well-formed fore leg, and from it arise the pectoral muscles of that limb and of the neighbouring parasitic right fore limb. The two breast surfaces are completely separated by the narrow quadrilateral space. There is no vestige of another set of ribs on the free (inner) edge of either, and the parasitic fore legs are attached between their upper ends. Some muscles arise out of the adipose tissue between them, one of which seems from its relations to the pectorals to correspond to the latissimus dorsi of the parasitic right fore leg. The relation of the parasitic fore legs to one another is that they adhere by the surfaces that would naturally come together if the body belonging to a pair of legs were suppressed, viz., the inner and posterior. They appear to be a pair belonging to a vertebral column and thorax which would have lain face to face with that of the well-formed animal (the developed twin), but which has disappeared or never been formed. The arrangement of the pectoral

muscles strongly favours this view of their relationships, as it is the same as is seen in the dipygus tetrabrachius (deradelphe), in which, to right and left of the head, a breast surface is formed by the union of a left side of one animal with a right side of the other, and the limbs form pairs across the plane of union of the bodies as well as across the median plane of each animal. In the present monster the ribs and sternum of the parasitic animal have never been developed, or have disappeared at a very early stage of its existence along with the vertebral column, leaving only the pair of arms, which, as shown by their muscular relations, also make pairs with those of the developed twin across the plane of union. The hinder division of the parasite consists of a pair of hind legs without trace of a pelvis, except the above-mentioned tubercle, which represents the tail. They are united to one another in the natural position. The heads of the femora are close together united by soft parts only. It is attached to the abdomen exactly in the fashion of the hinder part of a dipygus tetrabrachius. It ends above in a fleshy cord, which passes into the thorax between the lower edges of the breast surfaces. The heart lies above it (nearer the head), and more to the left of the developed twin. The monstrosity is clearly, as indicated in the title, a dipygus tetrabrachius or deradelphe, in which one twin is parasitic, only its four limbs and a few traces of the pelvic organs having been developed.

50.29. Kitten with Three Anterior Parasitic Limbs.

Presented by Dr. Thomas Reid, 1859.

The parasite consists of a pair of hind legs and a compound fore leg attached to the left side of the thorax in the same manner as in the preceding specimen. The compound fore leg has five digits and two carpal tubercles close together, and one of the outer digits is a dew-claw (thumb), showing that the limbs are fused, as in the preceding specimen, by their posterior and inner edges. It is a dipygus tetrabrachius with one of the twins parasitic on the other. Female. Not dissected.

50.30. Foetal Calf with Four Parasitic Limbs. Dipygus Tetrabrachius.

Hunterian. MM. 43.

(Deradelphe.) "A monstrous calf with two bodies, but much shrunk." Not dissected. The relations seem to be the same as

in the two preceding. The fore limbs are placed quite on the side of the neck anterior to the right fore limb of the developed twin, and the hinder parasitic limbs are also placed further forward on the chest than in the preceding specimens.

**50. 31. Turkey Chick with Anterior Parasitic Hind Limbs.
Dipygus Tetrabrachius.**

(Deradelphie.) The relations of the extra hind limbs to the body are exactly similar to those of the hinder part of the parasites in the kittens, Nos. 50.28 and 50.29. There is no trace of fore limbs.

SYNCEPHALUS.

This genus of monstrosities is closely related to the last members of the preceding dipygus tetrabrachius. The mode of fusion is the same, but the degree of doubling is greater, extending to the head. (Compare introductory paragraph before No. 50.14.) As in the dipygus tetrabrachius, there is complete duplicity below the umbilicus. Also the upper parts of the abdomens and the thoraces and necks are united face to face, and there are two breast surfaces, placed at the sides of the bodies, each formed by half from either foetus. Instead, however, of a single head facing the same way as one of the breast surfaces and showing only a trace of duplicity in the occiput, the head is distinctly compound. The two crania are united by their anterior surfaces, and the facial parts are united in the same manner as the parietes of the thoraces. In the most completely double form there are two crania, with a complete face on either side corresponding to the two breast surfaces, and likewise formed by half from either embryo (syncephalus symmetrus). Where the doubling is less, the median parts of one face are suppressed; there is a cycloopian eye, perhaps also a cycloopian nose, a mouth, and a pair of ears close together. In the least degree of duplicity there is a head similar to that of the dipygus tetrabrachius, but unduly wide behind, and with a posterior pair of ears more or less fused together placed about the junction of the neck with the occiput (syncephalus asymmetrus). The arrangement of the viscera is similar in the lower and in the higher degrees, but in the higher the two hearts and four lungs are generally better developed. The two hearts lie on the

plane of union immediately under the two sterna, and the oesophagus is always single and runs down between them in the centre of the neck and thorax. According to Förster, the medulla oblongata and cerebellum at least are always double and distinct. Most of the above points are illustrated in the succeeding specimens.

50. 32. Syncephalus Asymmetrus. Pig.

Hunterian.

(Synote.) A monstrosity of nearly full-grown foetal pig, showing the degree of syncephaly nearest to the preceding single-headed monsters. The head is very like that seen in the preceding series of kittens, but the occipital region, even without dissection, is clearly seen to be double, and there are four ears, the posterior pair fused together by the anterior edges of the pinnae. There is a single dimple in the centre of the compound pinna, but no proper meatus auditorius externus. The breast surface on one side had been split and the animal bent out flat, which shows the anatomy of the viscera very badly. One heart and two lungs (one belonging to each animal) are visible, and on turning these aside two more lungs and a second apparently equally well-developed heart are found in the other side of the thorax. The aorta of the anterior heart divides, and the two divisions pass into an aorta running down each vertebral column. The liver appears to be single. Injected red.

50. 33. Syncephalus Asymmetrus. Pig.

Hunterian.

(Synote.) A similar monstrosity stuffed, showing the natural external relationships of the two bodies, and the extra ears, which are fused together as in the preceding.

50. 34. Syncephalus Asymmetrus. Fallow Deer. *Hunterian.*

(Synote.) A similar monstrosity stuffed, showing the external form and the two extra ears in the occipital region. They are fused as in the preceding. On comparison with the dipygus tetrabrachius (deradelphæ) of fallow deer (No. 50.19), there is seen to be very little difference between the heads externally, except the presence of an extra couple of ears behind.

50.35. Syncephalus Asymmetrus. Lamb.*From Dr. Allen Thomson's Collection.*

(Iniopé.) This specimen, which has been born at an advanced period of gestation, is the nearest approach to syncephalus symmetrus or janiceps in the collection. On the one side is a well-formed face; on the other is a cyclopiian eye, nose and mouth both imperfectly formed but quite recognizable, and the ears placed nearly as far from one another as those of the perfect face. Both breast surfaces are divided through the middle of the sterna, showing the four lungs and two hearts. The liver is double, but fused across the plane of union. The small intestine is single for a considerable part of its length, and receives two bile ducts along with the ducts of two separate pancreases. The single part of the intestine ends in a wide sac, of roughly triangular shape, from each corner of which passes off the commencement of the two separate intestines belonging to the two separate lower bodies. From the free edge of this dilatation arises a single short diverticulum, doubtless the representative of a single vitelline duct corresponding to the single umbilicus. The monster is of the male sex.

50.36. Syncephalus. Human.*Hunterian.*

A very good example of the syncephalus asymmetrus (synote), in which the posterior face is represented by a nasal process similar to that of the cyclopiians (Nos. 50.63 *et seq.*), and a couple of ears fused together by their anterior edges. The foetuses are both well developed, and of size corresponding to the seventh month, measuring 14 inches (36 cm.) in length. The two crania have their anterior ends tilted up so as to lie base to base, and are both apparently complete up to the frontal bones. The compound cranium is therefore very broad, measuring 13 cm. (5 inches) wide and 27 cm. (10½ inches) from occiput to occiput over the vertices. The specimen is not dissected. The abdominal wall is membranous over a small area behind the common umbilicus. Below this it is well formed, and the external genitals (female) are also well formed.

50.37. Syncephalus Asymmetrus. Human.

A similar monstrosity, but very much misshapen. About the seventh month. The posterior, the ill-developed, face consists of a

diamond-shaped cyclopic eye, with a very small nasal process above it, a small depression representing the nasal aperture, and ears which are united by their anterior inferior corners. The head is very similar to that of the preceding, the bodies are very short and strongly retroflected; one of them has a large lumbar spina bifida. The abdominal walls are unformed, and the viscera hang in a membranous sac—a condition of eventration. The external genital organs are represented on each by a pair of what look more like labia than halves of a scrotum separated from one another; as no internal genitals are discoverable, the sex must remain uncertain. There are two livers; the intestines are very short, and both appear to end in cloacae, which lie split open in front between the remains of the genital organs.

(c) *Terata Anakatadidyma; Monstrosities showing
Duplicity of both Ends.*

50.38. Prosopo-thoracopagus. Fig. *Hunterian. MM. 41.*

This and the succeeding monstrosity belong to a genus very nearly related to the syncephalous monsters. They are united in similar fashion by the anterior parts of the thorax, abdomen, and neck, but the crania and upper parts of the faces are distinct. The lower jaws are united after the fashion of the thoracic walls in the monsters just described, viz., that each jaw unites not with its neighbour of the same animal, but with its *vis-à-vis* of the other animal. The next specimen is a typical prosopo-thoracopagus, the present one is intermediate between it and the syncephalus. The arrangements in the body are the same as in that genus—two breast surfaces, each belonging by half to either subject. There are two distinct crania and snouts, which, instead of facing one another as in the next monster, are turned to one side, and the one snout lies in the mouth of the other. There is only one distinct lower jaw, which is on the side towards which the faces are turned, and is formed by half from each animal. The two ears and two eyes on this side are well formed; on the other there is one well-formed eye belonging to the head that is biting the snout of the other head, and at the corner of the biting mouth is seen the upper eyelid of the second eye of the bitten head. There is no lower jaw at all on this side, and the ears are placed close together in the occipital region with their anterior

edges fused to a slight degree (synotia). Formerly described as "two pigs strangely jumbled, the posterior parts of the heads are together and of the chest, but the anterior parts of the abdomen: one of the heads has but one eye." The thoracic cavity is laid open from both sides, showing the viscera as in No. 50.35—two distinct hearts; four lungs; liver double, consisting of two halves placed laterally in the compound thorax, but united across the sagittal plane; alimentary canal single down to the point at which the vitelline duct joins the small intestine, below that point double. Pelvic organs all double and well formed. Female.

50.39. Prosopo-thoracopagus. Calf.

From Dr. Allen Thomson's Collection.

(Hemipage.) A double monstrosity of the calf, about 25 cm. (10 inches) long. The two animals lie face to face united by their anterior surfaces in the same way as in the preceding. Their sagittal planes are slightly oblique to one another, so that the heads are inclined a little towards opposite sides. There is also a marked lateral curvature of the spines in the dorsal region, which produces an unsymmetrical appearance about the thorax. The bodies are separate below the umbilicus; above it they are fused by each anterior edge of the lateral folds of one having united with the opposite edge of the other, producing a common thoracic cavity with two lateral breast surfaces belonging by halves to either animal, as described in the preceding monsters. The crania and upper parts of the faces are completely distinct, but the mandibular processes have united across the plane of union in the same manner as the thoracic parietes, producing a common buccal cavity with a lower jaw and tongue on either side, each belonging by half to both animals. There are two tracheae, which lie to right and left like the hearts, and between them is a single oesophagus, very wide, extending from vertebral column to vertebral column. A small septum between the roots of the tongues divides the beginning of the pharynx into two passages and proves the essential duplicity of the oesophagus. The larynges open at the root of each tongue on either side of the septum. The thoracic and abdominal viscera had been removed, and no description of them is known to exist. The monster is of the female sex.

THORACOPAGUS.

Double monstrosities consisting of two fetuses fused by the anterior parts of the thorax and abdomen above the umbilicus, which is single. The heads, necks, and hind quarters are distinct. In the highest degree of fusion (the only form represented in the collection) the lateral folds have united across the plane of union, constituting two breast surfaces looking right and left, forming a single thoracic cavity, the arrangement of the walls being the same as in the preceding three genera. The mode of origin, however, and consequently the arrangement of the viscera, is different. In the least degree of union (xiphopage) the fetuses are connected only by a fleshy band rising from each between the lower end of the sternum and the umbilicus; all the internal organs are perfectly distinct, so that it would be possible theoretically for them to be divided and live apart; in all the higher degrees this would be impossible. The leading points of difference, as described by Dareste (*Production Artificielle des Monstruosités*), are as follows: In all except the last-mentioned genus, where all the internal organs are distinct, the viscera of one of the fetuses are transposed. The heart may be single, compound, or double, and it is situated to one side of the median plane of the animal. Where there are two hearts, they lie on either side of the plane of union, instead of on it as in the syncephalus, and each is formed wholly by one fetus, instead of being formed by half from both. A compound circulatory system is the rule. There are two oesophagi which pass down in the natural position close to the vertebral columns, between them and the hearts, instead of a single median oesophagus. In consequence of this disposition of the viscera the thorax in these monsters is symmetrical across the plane of union but not across the median plane, whereas in the syncephalus it is symmetrical in both directions.

50. 40. Thoracopagus Tetrabrachius. Calf. Jeffray Collection.

Monstrosity about 25 cm. (10 inches) long, composed of two foetal calves fused together by the anterior parts of the thorax and abdomen from the root of the neck down to the umbilicus. The animals lie accurately face to face; both sides having exactly the same appearance externally. There are two equally well-

formed breast surfaces to right and left of the vertebral columns, each belonging by half to both animals, right ribs of one united with left ribs of the other. The two sterna are separated at their upper ends by a considerable space (1.5 cm.). The two breast surfaces were divided by longitudinal incisions extending down into the abdomen nearly to the common umbilicus, for examination of the viscera, and then sewn up again. The side of the animal which has been placed in front for exhibition is, it appears from the dissection, to be regarded as the front of the animal, and is so referred to in the description. The two animals are right and left with reference to this surface. There is a membranous area of abdominal wall round the umbilicus, which extends rather less to the front than to the back.

On dividing the anterior breast surface, the heart, which is single, was found in the centre with its apex directed to the left and also forwards (*i.e.*, towards the right side of the right animal and left side of the left animal). The diaphragm is well formed. The heart presents the appearance characteristic of a fairly advanced stage of intrauterine life, when the lungs and their vessels are very small. There are two ventricles, perfectly formed, but communicating by a small orifice in the upper part of the septum—the undefended area, which, even in the adult, is membranous and occasionally imperfect. They are clearly right and left ventricles, the right in front. Between the auricular appendages rises the conus arteriosus, grooved on both sides and containing the aorta and pulmonary artery, not yet distinct externally. The pulmonary artery communicates directly with the right ventricle alone. Above, it joins the aorta in the usual way by the ductus arteriosus. The branches of the pulmonary artery being very small, no attempt was made to follow out their distribution to the four lungs. The aorta rises from the left ventricle more directly, but a probe easily passes into it from the right ventricle by the gap in the septum. The arrangement of the ventricles and roots of the great arteries is strictly that of a fairly young foetal heart. The aorta passes into the right animal, and, on reaching its vertebral column, divides and sends one branch down it as the aorta of the right animal, and another along the first rib, across the manubrium of the posterior sternum, to the other vertebral column, which it crosses partly and then runs down as the aorta of the left animal. It required to be severed in opening the thorax; its ends are marked with glass rods. From

the latter aorta, shortly after crossing the manubrium, two branches arise, and run to the right fore leg and head of the left animal. The great vessels were not dissected further. The right auricle receives behind two pairs of vessels, which are an ascending and a descending vena cava, from each animal. It was opened in the middle and glass rods placed in the vessels to show their courses. The pulmonary veins were not dissected out, but their entrance into the left auricle was noted. The relations of them and of the left auricle to the right auricle and left ventricle appeared strictly normal when compared with a normal foetal heart in a similar stage of development. The foramen ovale appeared very large. The edge of the Eustachian valve was sufficiently prominent. The abnormalities fitting the single heart to discharge the functions of the double animal are, therefore, all in the blood-vessels. Though placed in the intermediate region of the thorax, the heart appears to belong more to the right than to the left animal. There are two tracheae and two oesophagi, which are related to the lungs, aorta, and vertebral columns of their respective animals in the normal way. The aorta of the left animal crosses behind the oesophagus to get to its left side. The liver consists of a large mass right across the upper part of the common abdominal cavity, lying to the right side of the right and the left side of the left animal. A small lobe also stretches obliquely across between the stomachs into the right side of the left animal. As mentioned above, there is only one umbilical vein, but it divides at a wide angle into two large and several small branches shortly after entering the liver; the two large branches pass away in the direction of the two inferior venae cavae. There is a bile duct passing to each intestine, and there are two spleens. The intestines and stomachs are double and quite distinct; the only connection between them being a fine cord about 2 cm. long which passes between the two small intestines in the lower jejunal (or upper ileac) regions. It has no connection with the umbilicus. The limbs are well formed; the genital organs (male) also.

50.41. Thoracopagus Tetrabrachius. Human.

Hunterian. MM. 33.

(Sternopage.) "Two children, about the seventh month apparently, growing together by the chest and abdomen." Not dissected,

but from external examination the monstrosity is of the same nature as the preceding. One of the foetuses is considerably larger than the other. The faces are turned towards opposite sides, each looking over the right shoulder of the other.

50.42. *Thoracopagus Tetrabrachius*. Human.

Hunterian. MM. 33a.

(Sternopage.) A similar monstrosity, "apparently at the full time." Not dissected. The heads have been turned so that both look the same way, and the bodies are also twisted from what was doubtless their natural position—facing one another. From the outside there appears to be a greater degree of separateness than in the two preceding specimens.

RHACHIPAGUS.

The next two specimens belong to a genus of monstrosities which resemble the preceding in being double at both ends, but differ from them in being united more or less laterally instead of face to face. The arrangement of the vertebral columns, which are fused and quite single in the cervical region, and of the thoracic viscera, is similar to that in the earlier members of the genus *dipygus tetrabrachius* (*deradelphie*), Nos. 50.16 and 50.17, but the head instead of being single is more or less double. The characters of the genus appear in detail in the description of No. 50.43.

50.43. *Rhachipagus*. Sheep.

From Dr. Allen Thomson's Collection.

A monstrosity of very early foetal age, probably of sheep. It has two heads united after the manner of a *diprosopus tetrophthalmus*, *i.e.*, by the posterior parts of the adjacent sides of the heads, so that there are two faces distinct in front of the eyes. There are only two ears, no trace remaining of the inner couple. There are two fore legs, which belong to different animals; vertebral column single from the atlas down to the lower cervical region, where it becomes double; and the abdomen below the umbilicus and the hind quarters are completely double. The thorax from the front appears to be single. On dividing the sternum, a heart, very large in proportion to the size of the animal, is seen; it appears to be well formed, and single. The lungs are

not visible. Behind, below the bifurcation of the vertebral columns, there is a second breast surface with two sets of well-formed ribs and a small sternum, on dividing which the posterior edges of the lungs come into view; how many lungs there are could not be made out. The trachea is rudimentary. It appears to be of double origin, continuing double to the root of the neck, thereafter it seems to be single; this could not be determined with certainty. There is no trace of a second heart. There is a single, proportionately very large, liver. The lower part of the alimentary canal and the genito-urinary organs are double and distinct. It is of the male sex. The specimen is not in condition for further dissection.

50. 44. Rhachipagus. Sheep.

Hunterian.

Monstrosity of the sheep, stuffed, new-born apparently at full time, showing a condition similar to the preceding. The anterior duplicity is slightly more extensive, four ears being present. The neck and thorax appear more decidedly single than in the preceding, the separation of the hind quarters appearing to begin further back. In its present condition further determination of the nature of the union is impossible.

DIVISION II.

ACARDIAC MONSTERS.

There are in the series six monsters belonging to this order, all acephalic. As stated in the introduction to the series, monstrosities of this description are always malformed twins, which are incapable of independent life, even within the uterus, owing to the absence of the heart. They depend for their circulation on the healthy twin, by anastomosis with its vessels in the placenta. Unfortunately none of these specimens has either a history of its birth or its placenta. Their nature, however, is quite clear.

50. 45. Acephalic Acardiac Monstrosity. Human.

Hunterian. MM. 56.

(Péracephale.) "A child without head, and without arms; the skin, too, appeared to be covered with a very long down, and

resembles somewhat a pig's skin. There appears to be no heart, lungs, diaphragm, or liver, but the whole cavity seems filled with intestines only; the left foot has only four toes." There are two sets of ribs and a vertebral column forming a rudimentary thorax. The vertebral column ends in a pointed process just above the ribs. No trace of a head. The feet are both in the position of talipes varus. The urinary organs seem well developed. The internal genitals are present, but very small; the external are well formed. It is a female.

50.46. Acephalic Acardiac Monstrosity. Human.

Hunterian. MM. 57.

(Péracephale.) "A monster very much resembling the former; there seems no head nor arms; there is one general cavity of thorax and abdomen undistinguished by diaphragm, in which there is no heart, lungs, etc. Its system of vessels is injected; and consists of one vessel which, as soon as it has perforated the navel, divides itself into four branches, two of which go to the upper part and two to the lower extremities, and another vessel running along the spine; these had carried on the circulation by their own powers of contraction during the whole period of utero-gestation, for the child seems to have been born at its full time." The last statement, about the circulation, is undoubtedly erroneous. In Hunter's time the nature of these monstrosities, and their necessary relation to a well-developed twin, was not known. (*Vide* Introduction to Section, Acardiac Monsters.) The feet are similar to those of the preceding. There are the external genitals of the female. There seem to be no internal genitals.

50.47. Drawing of the Vascular System in Preparation No. 50.46.

Hunterian. MM. 57a.

50.48. Acephalic Acardiac Monstrosity. Human.

From Dr. Allen Thomson's Collection.

(Mylacephale.) A monstrosity without head or arms, very like the preceding. Its upper part has been split. On pressing the two halves apart, the trunk is seen to be largely composed of fleshy sub-

stance resembling rather dense adipose tissue, covered by a very thick skin. In this is embedded a vertebral column with rudimentary thorax. The vertebral column ends at the top of the thorax. Its end lies about the middle of the front of the body; a small fleshy knob projecting before it represents the head. Heart, lungs, liver, and spleen are wanting. There are a few short loops of intestine and one kidney. There is a penis and scrotum. The left leg ends in a rounded fleshy knob with five rudimentary toes, three of them fused into one process; the right is better formed, but its toes are also rudimentary; they are drawn up and twisted inwards in similar fashion to those of the preceding.

50.49. Acephalic Acardiac Monstrosity. Human.

From Dr. Allen Thomson's Collection.

(Mylacephale.) "Acephalous human monster. Dr. Angus Mackintosh, 1860." Signed "A. T." A similar monster of smaller size. The main mass of the trunk is a rounded bag, which contained several ounces of muddy yellowish fluid. It lies over the spinous processes of a rudimentary vertebral column which ends at the top of a very imperfect thorax. Several threads like nerve fibres cross the sac. There is no opening into a vertebral canal to be detected. It appears to be a meningocele communicating perhaps with the anterior end of the canal, though the communication is not discoverable. The body cavity contains a pair of kidneys, one of which, with its suprarenal, is seen divided longitudinally. There is only one short loop of intestine in the abdomen, but several more in a rounded bag occupy the root of the umbilical cord. There are the external genitals of a female. The legs are in the natural position and well shaped, except that the left foot has only four toes. The skin is soft and natural.

50.50. Acephalic Acardiac Monster. Human. *Hunterian.*

(Mylacephale.) It consists of a pair of fairly well-formed legs and a pelvis, with a small portion of the umbilical cord. The legs are strongly flexed, and each foot has only four toes. There is a well-formed vulva. From the size of the limbs perhaps about the sixth month.

50.51. Acephalic Acardiac Monster. Dog (?)*From Dr. Allen Thomson's Collection.*

(Mylacephale.) A pair of hind legs, with a short rod-like axial bone, which is all that represents the pelvis. They are articulated with their heads close together. There is a penis and testicles. The right leg ends in a very malformed foot; the other in a rounded hairy knob. Apparently a monstrosity of the dog, though it is difficult to say what the animal has been.

DIVISION III.

SINGLE MONSTROSITIES; MONSTRA PER DEFECTUM;
MONSTRES UNITAIRES.*(a) Dwarfing; Zwergmissbildungen.*

The only examples of this condition in the museum are an articulated foot and leg which is placed in Series 5, Diseases of Bone, No. 1, and the portrait of Owen Farrell, or Leather-coat Jack, a dwarf well known in London in the 18th century, which is in the Picture Gallery: No. 43.

(b) Malformations of Individual Systems and Organs.

MALFORMATIONS OF THE LIMBS.

50.52. Sympus Dipus. Anencephalus. Human.*Hunterian. MM. 15.*

(Symèle.) A male foetus, finely injected red, and the anterior parietes of the thorax and abdomen removed. There is complete anencephalia and spina bifida, the whole cranial vault being wanting and the vertebral canal opened and flattened out into a wide shallow gutter covered by soft vascular membrane and with no recognizable spinal cord. The body ends below in a conical process, bifid at its extremity. The single part of this consists of the thighs, and the bifid parts are the legs. They end in very much deformed feet—that of the right having two toes, that of the left only one—and both feet are flexed to an acute angle upon the legs. The compound limb is more freely flexible upon the trunk forwards than backwards. The knee-joint bends forwards, and the soles of the feet are reversed.

The thorax and most of the abdominal viscera are well formed. The caput caecum and ascending colon are greatly distended, and of dark colour. The rectum is less distended, and appears normal where it passes out of sight in the pelvis, but it ends blindly. A dimple in the back just below and to the left of the lower end of the open vertebral canal probably represents the anus, but it is quite imperforate. There are no external genitals, but there are two testicles with gubernacula lying in the lower part of the abdomen.

50. 53. Phocomelus. Human.

From Dr. Allen Thomson's Collection.

(Phocomèle.) A male foetus, apparently about full time, of which the head and body are well formed, but the limbs are short and stumpy. In shape and position they resemble those of an embryo of six or seven weeks. The digits are short, but spread out from one another as in the early embryo, and the different joints are not indicated. The wrists and elbow-joints are recognizable; the upper arm is extremely short. In the lower limbs the ankles are marked by constrictions, but the rest of each limb hardly amounts to more than a buttock, on the lower and anterior part of which is planted the foot. The sole of the foot is directed inwards with the great toe nearer the head, as in the early embryo. It looks as if there had been an arrest of development without arrest of growth.

50. 54. Phocomelus. Human.

From Dr. Allen Thomson's Collection.

A similar monstrosity in a large male foetus. The head is of enormous size, and the cranium largely membranous—hydrocephalus. The arms and legs are in exactly the same condition as those of the preceding, except that the hands are a little better developed, the different joints of the fingers being quite recognizable.

50. 55. Peromelus. Human.

Hunterian. MM. 67.

A full-time female foetus, apparently well formed with the exception of the limbs. These are also well shaped but unduly short. All the joints are recognizable.

50.56. Peromelus. Human.*Hunterian. RR. 299.*

An embryo apparently, from its size, in the third month; the limbs are fairly well formed, but skin bound, *i.e.* bound down to the sides and front and enclosed in skin which is practically continuous with that of the body; the outlines of the limbs are quite distinct. The head is in a similar condition, the grooves of the neck being non-existent.

50.57. Peromelus. Dog. From Dr. Allen Thomson's Collection.

(Hemimèle.) A puppy, apparently new born, in which all four limbs are unduly short and the paws deformed, having only one or two rudimentary claws apiece. The folds of the elbows, wrists, knees, and ankles are quite distinct, as in the preceding human monstrosity. Male.

50.58. Perobrachius. Human.*From Dr. Allen Thomson's Collection.*

(Hemimèle.) A male foetus, both arms of which are deformed in the same manner. The humeral portion is about the natural size; the forearm is extremely short, and the radial side of it much shorter than the ulnar, in consequence of which the hand is doubled up on the arm to a condition of rather more than semi-flexion. The hand has only four digits, the thumb being completely wanting. The legs are badly formed, and there is double talipes—varus of the right, valgus of the left. The greater part of the abdominal viscera are protruded through a small defect in the abdominal wall into the root of the umbilical cord.

50.59. Peromelus Monobrachius. Dog.*From Dr. Allen Thomson's Collection.*

(Ectromèle.) A female puppy, apparently new born, the right fore limb of which is represented by a little hair-covered nipple-like process. There is also a double cleft palate. Otherwise the animal is well formed.

50.60. Peromelus Perobrachius. Cat. Hunterian. MM. 32.

(Ectromèle.) A young female kitten which has no left fore leg, and the right reduced to a forearm with rudimentary paw, which has only two digits, and these flexed to an acute angle upon it.

50. 61. Peromelus Abrachius. Dog.*Hunterian (?)*.

(Ectromèle.) A young male puppy without fore legs. On the right side of the breast is a mark, hairless like a cicatrix. Under this is felt the end of a concealed limb, in which a humerus and scapula can be distinguished. On the left a scapula can be felt, but there is no outward evidence of the limb unless a small nipple-like process of skin some distance below the scapula has been related to it. The animal appears to be well formed otherwise.

(c) *Malformations of the Nervous System, Skull, and
Vertebral Column.*

(A) CYCLOPIA AND ALLIED DEFORMITIES (MONSTRES
CYCLOCEPHALIENS ET OTOCEPHALIENS).

50. 62. Cyclopia. Human.*From Dr. Allen Thomson's Collection.*

(Rhinocephale.) A male foetus illustrating the above condition, but otherwise well formed and of large size. It is beautifully injected red, and the anterior parietes of the thorax and abdomen and the vault of the cranium and the brain have been removed. No account of the specimen is known. The orbits are represented by a narrow groove right across the face, expanded in the centre into a small rhomboidal space, the boundaries of which are the four eyelids. The orifices of the two lower lachrymal ducts are distinct with a large caruncle between them. The upper ones are further apart, and separated by a bony process covered with membrane resembling conjunctiva. The orbital cavities form one chamber with two divisions, which are connected below the above-mentioned process by a deep groove. The eyeballs are not definitely recognizable. The anterior fossa of the cranium is unduly narrow. In its present state nothing can be made of the relations of the nerves except that there appears to be only one optic foramen. Above the centre of the orbital groove projects a round process 1.5 cm. long and about 1 cm. in diameter, which represents the nose. It has a little blind pit on its tip. The mouth is well formed; the space between it and the orbit is flat and smooth.

50.63. Cyclopia. Human.*Hunterian. MM. 31a.*

(Rhinocephale.) "The head and shoulders of a monstrous child, having no nose, no eyes; it has apparently something like two eyelids, but placed in the middle where the nose should begin; over them hangs a proboscis broad at its base or pendulous end and becoming narrower at its attachment. It appears perforated in the middle for a little way, and seems an attempt towards forming a nose." On close examination all four eyelids are found to be present. Their relations are exactly the same as in the preceding. The eyeballs are not recognizable, but two conjunctival sacs are distinctly recognizable. They are joined below by a deep cleft, the remains of the lachrymal fissure, which in the early embryo connected the orbit with the nose. The anterior fossa of the skull is narrow. Brain removed.

50.64. Cyclopia. Human.*Hunterian. MM. 16.*

(Cyclocephale.) A female foetus, with the anterior parietes of thorax and abdomen, limbs, cranial vault, and brain removed. "There was a cranium and brain, but very small proportioned to the size of the child; the four eyelids seem to be jumbled together, as if they belonged to one eye in the middle of the forehead; the eye itself is wanting, and in the place of the nose is a smooth flat surface; contents of thorax and abdomen large and vascular." It is a similar condition to the preceding, but the coalescence of the orbits is more complete. There is only one conjunctival sac; the eyeballs are not recognizable. The base of the anterior fossa of the skull is very narrow, and there is only one optic foramen. Above the orbit, instead of a rounded proboscis projecting from the forehead like in the preceding, there is a broad rounded skin-covered membranous sac, which contained a hernia cerebri (encephalocele). The frontal bones form a thin rim round the borders of this projection. See next specimen for the brain.

50.65. Brain of Cyclopic Monster.*Hunterian. MM. 17.*

"The contents of the cranium from the preceding monster; cerebellum, with medulla oblongata, is very perfect but small, and cerebrum, which forms an oblong mass, is not above one-fifth of its natural size." The specimen is not well preserved, but taken along with the skull it shows, in addition to the above points, that

the cerebrum, which was lodged in the hernial sac, was placed in front of instead of above the mid brain. The floor of the third ventricle thus lies naked to view; it is formed by a single mass of brain tissue, representing the two optic thalami fused together; the only indication of their natural distinctness is a slight groove on the front of the mass.

50. 66. Cyclopia. Sheep.

Professor Young. 1897.

(Cyclocephale.) The head of a lamb showing a condition similar to the preceding. There is a single orbit containing a single eyeball. The forehead is a rounded boss overhanging the orbit—much more prominent than the forehead naturally is in the sheep. The face below the orbit is depressed, and the upper jaw is considerably shorter than the lower. Not dissected.

50. 67. Ethmocephalia and Double Cleft of Jaws and Palate. Human. *From Dr. Allen Thomson's Collection.*

Presented by Dr. Pagan. The condition of the orbits is allied to that in the cyclopians. There are two distinct orbits placed abnormally close together. The anterior fossa of the skull is narrowed; there are two optic nerves which enter optic foramina separated only by a thin edge of bone. The middle of the face is flat, the position of the bridge of the nose being occupied by a deep groove in the skin. Above this groove in the middle line there is a slight prominence of the forehead, representing the root of the nose. Below the groove are two little eminences, probably derived from the median nasal processes. Below the two eminences is a median depression, with a shallow groove at either end curving downwards around a couple of little eminences, which have unmistakably the appearance of the alae of the nose, and accordingly represent the lateral nasal processes. Below the alae of the nose opens a large naso-oral orifice, of triangular shape, with a little bay, representing the nostril, on either side of its apex. Within this naso-oral cavity are seen the halves of the palate, widely separated, and the turbinate bones, but no intermaxillary process or vomer—only a thin ridge in the middle of the roof, which represents probably the median plate of the ethmoid. The leading factor in the deformity of the face appears to be defect—a non-descent—of the fronto-nasal and median nasal processes, which go to form the point and bridge of the nose,

nasal septum, and intermaxillary portions of the upper jaws. The result is that there is no nose, and that by a complete double-cleft palate and harelip the nasal and buccal cavities are thrown into one. The condition of the orbits corresponds with the description of the ethmocephale of I. Geoffroy St. Hilaire, though in other respects the monster is different.

50.68. Cyclopia. Ethmocephalia and Phocomelia. Human.

From Dr. Allen Thomson's Collection.

(Ethmocephale.) A male foetus showing a deformity of the face allied to cyclopia, resembling that described as ethmocephalie by I. Geoffroy St. Hilaire. The eyes are set in distinct orbits, and at a fairly normal distance apart; but, instead of a nose, there lies between them a triangular process, with a broad and thick base in the middle of the forehead, tapering from the level of the eyes to a point which dips down in the centre of the face into a pit about 6 mm. deep. From either eye a deep groove (lachrymal groove) runs downwards and inwards, separating the triangular process from the cheeks. At the end of each groove is a tiny nostril. The point of the triangle forms a narrow column between them. From the pit in the centre of the face (at the point of the columna nasi) a deep groove runs down to the mouth, but neither the lip nor the gum is cleft. A probe passed in by either nostril appears in the mouth on either side of the septum nasi, which is well developed. There is, therefore, a double cleft of the posterior region of the palate. The thick median ridge on the forehead, with its triangular continuation, represents the fronto-nasal process developed into a sort of point and bridge of the nose, while the alae, which are formed from the lateral nasal processes, have remained in a rudimentary condition, and the lachrymal grooves have persisted. All four limbs are short and stumpy, with stumpy digits; a condition of phocomelia. Compare No. 50.53.

(B) CYCLOPIA IN THE LOWER ANIMALS.

50.69. Cyclopia with Single Eye and Agnathia. Pig.

Hunterian.

(Edocephale.) A young male foetal pig, about 13 cm. ($5\frac{1}{2}$ inches) long, showing the above condition. The nose is represented by

a proboscis about 2 cm. long, the end flattened like the snout of a pig; in the centre of the end of it is a single shallow pit—the nasal pit. Below the proboscis is a large and prominent single eye, the only evidence of duplicity in the organ being a little groove in the middle of its upper surface. The eyelids form a little fold of skin at the base of the eye. There is almost complete absence of the jaws. The ears are twisted forwards and inwards to the front of the neck, almost coalescing by their lower edges. In the flat space between them is a little oval hole. Whether this represents the mouth or the meatus auditorius externus is doubtful. The body and limbs are well formed.

50.70. Cyclopia with Compound Eye. Pig.

Hunterian. MM. 30.

(Rhinocephale.) “A monstrous pig; one eye wanting, the other large in the middle of the forehead; nose imperforated; from the size of the head brain probably deficient.” A fairly large female foetal pig. The proboscis rising from the centre of the forehead is about 3 cm. long, and has an end very like the tip of an elephant's trunk. Below it is a large prominent eyeball, in shape a fair oval horizontally, and with two distinct corneae on it. The opening of the eyelids is a rhomboidal space, its sides (somewhat curved) representing the four eyelids. The maxillae end in a narrow turned-up convex hairy point. The lower jaw and tongue appear well formed. The ears are in their natural position. The whole skull and face bones had been removed through the mouth, and they are not now in the collection.

50.71. Cyclopia with Single Eye. Pig. *Hunterian. MM. 31.*

(Rhinocephale.) A fairly large female foetal pig, similar to the preceding. It has a proboscis “like an elephant's growing out of the forehead.” This is fully 3 cm. long, and has a bony core extending about half of its length. Its end is more like the flat snout of the pig than the tip of the elephant's trunk; it has a single nasal pit, marked with a bristle. The eye socket resembles those in the human monsters, Nos. 50.63 and 50.64. There are four eyelids, the lower ones larger and better formed than the upper, making a rhomboidal opening, in which lies a flat sac with a single circular cornea; it is recognizable as an eye mostly by

the presence of pigment in it. This sac lies almost entirely to the left of the middle line, and is overlapped by the left eyelids; there is no separate sac to the right. The lower jaw is well formed; the ears are in the normal position.

50.72. Cyclopia with Compound Eye. Kitten.

(Cyclocephale.) A female kitten, apparently new born, having a cycloopian eye with two corneae fused by their inner edges. There is no proboscis. The upper jaws are rudimentary; the ears are in their natural position.

50.73. Cyclopia. Otocephalia. Dog. *Hunterian. MM. 29.*

(Opocephale.) A young male foetal dog with a strikingly malformed head. There is almost no cranium, but on the top of the head is a single eye in a rhomboidal socket. The four eyelids are distinct, and the eyeball has a well-formed cornea in front, slightly towards the right, and separated by a white line of sclerotic from a narrow pigmented area, which seems to be a second cornea; it is as if the right eye had developed freely, crushing the left to the side and hindering its growth. There is no proboscis above the eye, and below it there is only a rounded hairy knob without trace of mouth or jaw in it. The ears are distinct but close together, their lower borders almost meeting across the front of the neck. In the old catalogue MM. 29 is described as "a young calf; no brain, no nose, no mouth, one eye on top of head"; but the animal in the jar is a dog, which answers to the rest of the description.

50.74. Cyclopia. Triocephalia. Dog. *Hunterian. MM. 66.*

(Triocephale.) "A puppy where there are no eyes, no nose, an irregular fissure for the mouth, and the ears placed at the angles of this fissure." The head as a whole is very small. There is a small tubercle on the front of the skull which may represent the nose. The ears have coalesced by both edges of their bases in front of the throat, and the fissure described as a mouth is a compound single meatus auditorius externus, or rather the remains of the first branchial clefts, from which the meatus, tympani, and Eustachian tubes are developed.

50.75. Agnathia. Pig.

The head and thorax of a young pig, the lower jaw of which is entirely wanting. The anterior part of the upper jaw to a little way behind the canine teeth is well formed. Behind that the two alveolar processes converge till they almost meet. The pharynx ends in a *cul-de-sac*. From below, the oesophagus and trachea are pervious to about the middle of the neck. The cranium and upper parts of the face are well formed; the ears are in the natural position.

(C) ANENCEPHALIA, AMYELIA, AND HEMICRANIA (ANENCEPHALIE, EXENCEPHALIE, AND PSEUDENCEPHALIE).

50.76. Complete Anencephalia and Amyelia. Human.

From Dr. Allen Thomson's Collection.

(Anencephale.) A male foetus about the seventh month, with the whole roof of the cranium and vertebral canal wanting. The eyes stand out prominently from the head, looking upwards, with a thin supraorbital ridge behind them. The top of the head consists of the flattened-out base of the skull, overlaid by soft membrane, which round the edges is continuous with the skin. In the centre lies a soft flat cyst about 3 cm. in diameter. The membranous area is surrounded by a narrow circlet of hair. The vertebral canal is laid out flat; it is covered by a membrane similar to and continuous with that covering the base of the skull. In it appear the roots of the spinal nerves, rising widely apart and running inwards and downwards to the foramina in the cervical and dorsal regions, and in the lumbar and upper sacral regions forming a regular cauda equina. In other respects the foetus is well formed.

50.77. Anencephalia and Amyelia. Human.

From Dr. Allen Thomson's Collection.

(Anencephale.) One half of a similar foetus, divided by sagittal section passing nearly in the median plane. The covering of the base of the skull is a delicate membranous cyst, with a little greyish matter resembling brain substance lining the inside; that of the vertebral canal is purely membranous. The vertebral column joins the base of the skull at a very sharp angle. The face bones, thoracic and abdominal viscera, and the limbs are well formed.

50.78. Skeleton of Anencephalic and Amyelic Foetus.*From Dr. Allen Thomson's Collection.*

(Anencephale.) The cranium and vertebral canal are laid widely open from the back of the orbits to the coccyx. The lower and upper jaws and nasal bones are well formed. The supraorbital ridges are thrown far back; the orbits are shallow and look upwards as well as forwards, which accounts for the prominence and position of the eyes in these monstrosities. All the squamous bones composing the vault of the skull are absent. The base makes a triangular surface, broad behind like the head of a venomous snake, and convex upwards; the widely-separated condylar processes of the occipital bone and the mastoid processes of the temporal bones form the broad base of the triangle. The floor of the flattened vertebral canal is somewhat concave. There is also an anterior fissure of the vertebral column, extending from the first lumbar vertebra through the sacrum and coccyx, the two sides of the tip of the last being united by fibrous tissue. Each row of half vertebral bodies is nearly as broad as the whole vertebral bodies above the fissure. At the point of fissure the vertebral canal is occupied by a lobed mass, about the size of a walnut. Microscopically this is found to consist of a dense fibrous stroma, rather like that of the ovary, with numerous blood-vessels, some clear structureless rounded masses, and some masses of round cells, enclosed in a capsule like a very cellular mucous membrane. This membrane is covered by an epithelium with very high clear cells, which dips down here and there as if into the mouths of tubular glands. In the mouths of these glands the epithelium is seen to be ciliated and also stratified. It is a deep "tailed" epithelium rather like that of the tubuli testis. In the deeper parts of the glands it is stratified, but the cells are shorter and without cilia. Nature of the mass unknown. (MS. Notes, J.H.T., p. 162.) The skeleton apart from the cranium and vertebral column is well formed.

50.79. Anencephalia and Amyelia. Human.*Hunterian. MM. 8.*

(Anencephale.) A well-grown male foetus, part of the arms and legs removed, "to admit of its going more readily into the bottle." The vault of the cranium is wanting, and the base is covered by a loose bag of thin membrane. The membrane is

continuous at the edges with the skin. It is surrounded by a narrow circle of hair. The vertebral canal is also open and laid flat down to the sacrum. Its floor is covered by thin membrane, which "shows nerves but no spinal marrow." The head is thrown strongly back; there is practically no neck, the hairs of the scalp passing down between the shoulders; the vertebral canal is thereby greatly shortened.

50.80. Anencephalia and Amyelia. Human. *Hunterian.*

(Anencephale.) A similar foetus; female. The retroflexion and shortening of the cerebro-spinal tract are very marked

50.81. Anencephalia and Spina Bifida. Human.

Hunterian. MM. 4.

(Derencephale.) A male foetus, apparently about seven months, showing a similar condition. The base of the skull is covered with a sac "like a production of pia mater, which contained a fluid." The spinal canal is open and laid flat to the lower dorsal region. In the lumbar and sacral regions it has been dissected, showing a well-formed cauda equina. The retroflexion in the upper parts is very marked. The eyes, which are very prominent even for this condition, occupy the summit of the head. There is also a double harelip.

50.82. Anencephalia. Human.

Hunterian. MM. 1.

(Derencephale.) "The head of a monstrous child; everything above the eyes, that is, all the cranium, wanting, and consequently no brain." The top of the head is almost entirely skin-covered, which has allowed the cranium to be removed from below without destroying the soft parts. See next specimen.

50.83. Skull of Anencephalic Human Monster.

Hunterian. MM. 2.

Skull of the preceding, dissected. All the squamous bones forming the vault of the skull were completely absent; the base forms a flat surface level with the eyes. The condylar processes of the occipital bone approach but do not quite meet one another behind

the foramen magnum, which is consequently incomplete. In it appears the cut end of the medulla oblongata. There is no fissure of the vertebral column.

50.84. Anencephalia. Human.

Hunterian. MM. 3a.

(Derencephale.) The head of an anencephalic foetus, injected red. The head is bent back, the large goggle eyes standing up as its highest point. Behind them is a fringe of hair; then a round area covered with soft highly vascular membrane extends down to the root of the neck in place of the brain and upper part of the spinal cord.

50.85. Anencephalia. Human.

Hunterian. MM. 14.

(Derencephale.) "A large child in this class, injected minutely red; the small fungus in the cleft of the head divided; it is extremely vascular in the centre, and a substance not unlike pineal gland, likewise very vascular, appears to have been surrounded by this fungus. The vertebral canal is open (dissected); spinal marrow is seen one-third its natural size; the nerves going from it small and degenerated; the anterior parietes of thorax and abdomen removed; the viscera of both cavities plump, large, and sound, exceedingly vascular; the size of the child upon the whole rather large." The retroflexion is less marked than in the preceding.

50.86. Anencephalia. Human.

From Dr. Allen Thomson's Collection.

An anencephalic foetus; the head is intact, but the vertebral column and pelvis have been carefully dissected out, and the bodies and spines of the vertebrae down to the coccyx carefully removed, leaving only the series of lateral masses. The dura mater has then been dissected away before and behind to show the spinal cord and nerves. The base of the skull is covered, as in the preceding monsters, by a loose sac of thin membrane continuous at the edges with the skin and below with the dura mater of the spinal cord. The spinal cord is represented by a thin transparent ribbon of membrane resembling pia mater, which can be traced above into continuity with an indistinct inner lining of the membranous sac.

From it arise extremely attenuated and transparent nerves. The region of the lumbar enlargement and the nerves of the cauda equina appear a trifle solidier than the rest. The arrangement of the nerves is perfectly natural.

50.87. Anencephalia. Human.

Hunterian. MM. 9.

“A very large entire brainless child, at the ninth month; though vigorous just before labour, such children generally expire as soon as born.” It is well formed, with the exception of the cranium and brain.

50.88. Anencephalia. Human.

From Dr. Allen Thomson's Collection.

Similar to the preceding; not so large, but equally well formed.

50.89. Anencephalia. Small Anterior Meningocele. Double Harelip.

Hunterian. MM. 63.

The head of a large foetus, with the upper parts of the cranium so completely unformed that the orbits and even the eyelids are absent, and the eyes lie bare on the top of the head. The base of the skull is covered by an irregularly lobed mass of thin-walled cysts, some of which have burst and lie collapsed. The bridge of the nose is replaced by a cyst of the same description, measuring 3 cm. in diameter. (Proencephale.) Below this is a flat bar of flesh representing the point and alae of the nose. There is complete double harelip and cleft palate.

50.90. Hemicrania. Human.

Hunterian. MM. 62.

(Nosencephale.) Head of a large foetus, injected red. The frontal and parietal regions of the vault of the skull are absent, as in the anencephalic monsters, to which this monster is closely allied; but there is a rim of squamous bone in the occipital region, with a distinct foramen magnum, and the base of the skull is occupied by a large lobulated vascular tumour, which can be felt to be cystic in parts. (Pseudencephale.) The eyes, as in the preceding set of monsters, are large and prominent.

50.91. Hemicrania. Human. *Hunterian. MM. 10.*

(Nosencephale.) A similar head uninjected. "On the top of the head, uncovered by the common integuments, is an irregular fungous-looking substance, presumed to be a degeneration of brain: this substance is generally very vascular." A slice of the tumour has been cut away on the right side, laying open several small cysts, surrounded by tissue which closely resembles that of the corpora cavernosa penis; these tumours, in part at least, are of the nature of angiomata.

50.92. Hemicrania. Human. *Hunterian. MM. 12.*

(Nosencephale.) "The superior half of a child similar to No. 10 (*MM. 10*—the preceding), minutely injected red." The vascular tumour, in its irregularly-lobed shape and bright red colour, resembles the wattles on the neck of a turkey cock. The former catalogue says, "The fungus on the head exceedingly vascular as if it were pia mater collapsed, now that the brain was gone; the thorax opened; heart and lungs very perfect."

50.93. Hemicrania. Human. *Hunterian. MM. 7.*

(Nosencephale.) A similar head, but not injected. "Everything above the eyes, that is, all the cranium, wanting," except the occipital region and base. "There is also a double harelip, large staring eyes, and something like remains of brain on the top of the head, but uncovered by the common integuments."

50.94. Hemicrania. Human. *Hunterian. MM. 13.*

(Nosencephale.) Head of a foetus injected red, showing a condition very similar to the preceding. The skull above the eyes is as flat as in anencephalia; but, instead of the vault being absent and the base bare, the vault seems to have developed imperfectly, leaving a gap in the centre, around which it has collapsed upon the base. The gap, an area about 4 cm. in diameter, is occupied by a small vascular tumour similar to those seen in the preceding specimens. The rest of the top of the head all round it is covered with skin.

50. 95. Anterior Hemicrania. Human. *Hunterian. MM. 3.*

(Thlipsencephale.) The head and shoulders of a foetus. The head is of the same shape as in the anencephalic monsters, but the anterior part of the top of it is covered with bone and hairy scalp, forming a sort of half cranium, whence the name. "There is a kind of wart, or cicatrix-like appearance, in the integuments behind," extending from side to side, and from the neck up to the vertex. This membrane is continuous with the skin round the edges. In the centre of it is a small excrescence similar to that seen in the preceding.

50. 96. Anterior Hemicrania. Human. *Hunterian. MM. 61.*

(Pseudencephale.) Head and shoulders of a foetus similar to the preceding. The cervical portion of the vertebral canal is also open, laid out flat, and covered by a thin membranous sac, which allows the bones to be seen clearly. The base of the skull and the vertebral column meet at an acute angle, as is seen in the anencephalia and amyelia (No. 78). The vault is laid flat, close down on the top of the basi-occipital. There is a small fungous excrescence as in the preceding, which is raised to show the shallow slit representing the cranial cavity.

50. 97. Hemicrania. Posterior Encephalocele. Amyelia. Human. *From Dr. Allen Thomson's Collection.*

(Pseudencephale.) A foetus about the seventh month, with small flat cranium, which is deficient in the occipital region. From the hole hangs a loose round sac 6·5 cm. in diameter, streaked with black pigment externally. Its walls are fairly thick, and part of their substance resembles brain tissue. The sac hangs down over the neck to about the middle of the dorsal region; it is torn below. The vertebral canal is open and laid flat from the occiput to the lumbar region—amyelia.

50. 98. Posterior Exencephalia with Amyelia.

From Dr. Allen Thomson's Collection.

(Pseudencephale.) Similar to the preceding.

50.99. Posterior Encephalo-meningocele. Human.*Hunterian. MM. 5.*

The superior half of a large foetus. There is a fairly large skull, with the top removed, and a considerably larger sac hanging from it behind. The sac has a fringe of hair round its base and is covered with skin, which becomes gradually thinner towards the centre where it is quite membranous. It is double, consisting of the large outer sac and a smaller inner sac of soft membrane. The two halves of the tabular part of the occipital bone have united above the neck of the protrusion by a narrow bridge, leaving a large gap continuous with the foramen magnum, through which the protrusion has taken place. The cavity of the cranium is of fair size, and it is occupied by collapsed membranes. If there ever were any brain tissue it has been removed. The membranes form two sacs, both opened from above. The outer of these is dura mater, and its cavity communicates freely through the gap in the occipital bone with the outer sac of the tumour, forming a meningocele. The other resembles pia mater, and it communicates with the inner sac of the tumour, the walls of which are of similar texture. In the wall of the inner sac within the cranium are seen numerous nerves, certain of which can be traced to their foramina, as the optic, third, and fifth nerves. The inner pair of sacs are, therefore, the remains of the brain and an encephalocele.

50.100. Anterior Encephalocele. Hydrocephalus. Human.*Hunterian.*

(Proencephale.) A full-grown female foetus, with large head and what looks like a second cranium attached to it in the frontal region. The cranium had been opened by a sagittal incision over the top of the excrescence, and the brain removed; no account of it is known. The cranium proper and the top of the excrescence are covered with ordinary hairy scalp. The cranium proper is abnormally large and round; very broad behind. A considerable area, corresponding to the lateral fontanelles, temporo-parietal, and outer parts of the parieto-occipital sutures, on either side, is membranous. Over the top of the excrescence a large area, beginning at the root of the nose in a narrow angle, widening to 5 cm. broad on the top, and narrowing again to a point near its base behind, is membranous. The base of the excrescence is slightly

constricted, the sides bulging to right and left above. Its front rises abruptly above the eyes and root of nose, sloping forwards considerably and forming a large expanse of forehead crowned with the hair of the scalp. Inside there is a large rounded chamber, the floor of which is the anterior fossa of the skull. In the position of the external constriction it narrows to a neck bounded below and on the sides by the strongly projecting sharp edges of the great wings of the sphenoid; above and behind by a rounded ridge following the line of the frontal-parietal suture. The excrescence therefore consists of the frontal bone, whose halves are stretched and pressed asunder. Behind it is a median ridge about 3 cm. long by 2 cm. wide, by about 1 cm. high, in which the space between the parietal bones has been bulged up. Its sides are osseous, a rhomboidal area of its summit membranous. The posterior and inner parts of the parieto-occipital sutures are closed with bone. The cavity of the cranium proper is very wide, corresponding to its external dimensions, and the middle fossa is covered to an unusual extent by the great wings of the sphenoid. Dimensions—cranium, antero-posterior, 9 cm.; side to side, 10 cm.; circumference, 31·5 cm. The corresponding dimensions of the excrescence are 10 cm., 8 cm., and 27·5 cm.; the circumference of its base, 25·5 cm.; height of the cranium from meatus auditorius externus to vertex, 6·5 cm.; from same point to top of excrescence, 12 cm.; greatest height of do., 7 cm. The sides of the excrescence are osseous. All four limbs are slightly stumped—peromelia.

50.101. Encephalocele. Adhesions of the Amnion. Human.

From Dr. Allen Thomson's Collection.

(Podencephale.) A male foetus, apparently about the eighth month, with its placenta and membranes. The cranium is very small, hardly rising above the line of the eyes and ears. The vertex is deficient rather more to the right than left, and from the gap a loose oval sac (an encephalocele) with thick soft walls hangs down upon the right shoulder. The surface of the sac looks like the skin of a cicatrix. The placenta and membranes lie on the bottom of the jar. A long strip of membrane, now twisted into a cord, but measuring 12 cm. at its widest part, is attached by two narrow flattened cords to the front of the encephalocele near its base. The nose and left eye are well

formed; the right eye is wanting, and from the slit representing its orbit a cleft passes down to the mouth—a persistence of the lachrymal cleft. It does not communicate with the nose, though the right alveolus and palatine process are absent, as the intermaxillary portions are well formed. The left angle of the mouth is continued in a deep cleft back to the pillar of the fauces—a condition called macrostomia. In other respects the foetus is well formed.

**50.102. Encephalocele. Aproposus. Perobrachius. Even-
tration. Human.**

Hunterian. MM. 60.

(Proencephale and Pleurosoma.) A female foetus, apparently about full time. The frontal bone, including the orbital ridges, and the parietals are deficient, and in place of them rises a large sac of irregular shape, the largest lobe of which hangs to the left—a smaller one to the right. The left and most of the right lobes are covered with skin and hairy scalp. The top of the left lobe and the area between them on the top and front present the appearance of a cicatrix, with several small bridges of skin, and is in parts thin and membranous. It is also torn in two places. The placenta and membranes are not preserved. There is hardly any face; a single hole represents the naso-oral cavity, and two little dimples overhung by the cysts the orbits. The old description is, “a female child exceedingly deformed; the face is without distinction of eyes and nose, and there is a large tumour arising from the left side of the head; the viscera are external on the left side, from behind the left shoulder to the pelvis; the two upper extremities are very much changed from their natural appearance, the left being very short, and its hand is distinguished by four fingers only, not very perfect; the hand of the right arm has its fingers very imperfect, and the wrist is surrounded by three processes, not very unlike the spurs of a young fowl; its lower extremities are tolerably perfect.” The processes are little tags of skin, each about 1 cm. long.

50.103. Meningocele. Pig.

From Dr. Allen Thomson's Collection.

A young pig with small flat skull having a couple of loose wrinkled cysts on the top of it between the eyes. A label on the jar says it “was born along with nine others, and lived seven-

teen days. 1864." Name of donor obliterated. The walls of the cysts are thin skin, and are covered with fine hairs. That on the left is larger, nearly as big as the head; it is opened, and is found to communicate with the interior of the skull by a round aperture in the bone, which admits the point of the thumb, just above the supraorbital ridge. Through this the brain can be felt. The other cyst communicates with the cranial cavity by a smaller hole similarly situated on the right.

50.104. Notencephalus. Human.

Hunterian (?).

(Exencephale: St. Hilaire.) A large female foetus with well-formed limbs. The head is retroflexed upon the neck to an extreme degree, lying almost wholly behind the axis of the body; the eyes, large and prominent, look upwards and, if anything, backwards. The top of the head is flat, and the forehead slopes actually downwards behind the eyes; the vault of the cranium from the frontal bones back is deficient, as in posterior hemicrania. There is practically no neck. Immediately below the back of the head, below the level of the shoulders, lies a large symmetrical bilobed mass, which is the brain. It occupies the dorsal region, lying on the top of a flat open vertebral canal; reaches from side to side of the body, and measures 4 cm. in the axis of the body, 10 cm. across. Below it is a cicatricial membranous area, 4.5 cm. wide by 3 cm. long, under which can be felt the bodies and flattened-out arches of the lumbar vertebrae; the sacral region is clothed with unaltered skin. The sac (dura mater) of the right side has been removed to show the brain. The cerebral hemispheres are almost in contact at their anterior ends, then diverge so that the corpus callosum comes fully into view. At the posterior end of the hemisphere lies the right half of the cerebellum, separated by a distance of 5 cm. from its fellow of the opposite side. The fore limbs, the posterior part of the body from the lower lumbar region, and the lower limbs are well formed.

50.105. Notencephalus with Meningocele. Human.

From Dr. Allen Thomson's Collection.

(Exencephale.) A female foetus of about seven months, with the head greatly retroflexed and flattened on the top, and the cranium deficient behind, as in the preceding. The back of the head lies

right between the shoulders, and there is no neck. The thorax is pushed forwards, and the buttocks turned up by bending forward of the dorsal region of the vertebral column. The hollow in the back is filled up by a loose rounded sac considerably larger than the head, directed considerably to the left, and covering the whole breadth of the back and part of the left side down to the lumbar region. It is covered with skin, which is very thin and had ruptured over the apex. On enlarging the hole the sac is found to be lined by a thin firm membrane, apparently *dura mater*. Inside it is seen a second sac, not much smaller, and composed of membrane similar in appearance and texture. On opening this the right cerebral hemisphere and right lobe of cerebellum were found, lying almost in the middle line. To the left was felt the other half of the brain, the relative position of the two halves being much the same as that described in the preceding specimen. The inner sac seems to be arachnoid and *pia mater* somewhat thickened. The outer sac is a large meningocele. The cranium is deficient behind, the vertebral canal completely open down to about the upper lumbar region, and the brain displaced entirely out of the cranium into the dorsal region. The characteristics of the monster seem to be intermediate between the *exencephale* and *notencephale* of I. Geoffroy St. Hilaire. The monster has also a double harelip, and in the angle between the meningocele and the shoulder on either side there is a little thin walled cyst.

50.106. Extreme Retroflexion of Head and Body with Lumbar Meningocele. Human. —

A male foetus of about seven months, presenting a condition apparently allied to the preceding. The cranium is well formed, very high in the vault, and there is such a degree of retroflexion of the head that it lies fairly between the shoulders. The vertebral column being at the same time bent strongly forward, the occiput actually rests on the sacrum. In the angle between the occiput and the right buttock projects a meningocele, about the size of a tangerine orange (5 cm. in diameter). The specimen is not dissected. In the extreme degree of retroflexion this monster resembles closely the two preceding, and the meningocele indicates an unclosed vertebral canal; but, instead of a small collapsed cranial cavity, and the brain lying in the meningocele, the cranium has been carried a little further back than in the two preceding, and still encloses it. The cerebro-spinal axis is extremely short, quite as

much shortened as in the other two. There is also much greater doubling forwards of the dorsal region of the vertebral column. The monstrosity answers fairly well to the description of the class *Iniencephale* of I. Geoffroy St. Hilaire, except that the dorsum is completely covered with skin.

(D) HYDROCEPHALUS.

50.107. Hydrocephalus. Human.

Hunterian.

A very large dried skull, showing the above condition. The face bones appear those of a child; the canines and second molars of the first set of teeth being still below the periosteum, the subject was probably in its third year. The cranium all round overhangs the base and bones of the face, and appears enormous by comparison with them. The orbital plates appear to be pushed down by the distending force within the skull. The width of the orbits is 9 cm., of the forehead directly above the points of measurement 12 cm. The frontal and parietal eminences projecting strongly give the head a quadrangular shape. The width between the latter is 19 cm. The circumference of the cranium is 65.3 cm. ($25\frac{3}{4}$ inches). Its antero-posterior diameter is 19 cm., and its height 18 cm. A very large irregular quadrate area in the position of the anterior fontanelle, its angles reaching forwards between the halves of the frontal bones to the middle of the forehead and downwards on either side to the anterior inferior angle of the parietal bone, is membranous. A narrow line in the position of the sagittal suture, extending back to the lambda, is also membranous. The parieto-occipital sutures are fully 3 cm. wide, the space is filled in with wormian bones. The base of the skull is elongated, and the occipital protuberance very prominent.

50.108. Hydrocephalus. Human.

Hunterian.

A very large skull showing the above condition, cleaned and dried. The face bones are very small. The teeth are badly formed, and several are absent. The first temporary molars are scarcely developed; the canines project from the alveoli. The skull is much better ossified than the preceding; the subject was perhaps a little older. The shape is similar but more rounded. A large rhomboidal area in the region of the anterior fontanelle has been

membranous. Its angles do not extend beyond the top of the head into the sutures, as do those of the preceding. The sutures are all wide, and they are filled in with wormian bones of various shapes and sizes; in the sagittal suture are one or two small membranous areas. The frontal suture and those between the different parts of the occipital bone are quite distinct. Circumference, 63.2 cm. ($24\frac{3}{4}$ inches). Diameters—antero-posterior, 19 cm.; transverse, 17.5 cm.; vertical, 16 cm.

50.109. Hydrocephalus. Human.

From Dr. Allen Thomson's Collection.

A very large and well-ossified skull, macerated and dried, showing the above condition. The first permanent molars are fully developed, and the right central incisor projects considerably from the alveolar process. From a subject of seven or eight years at least. The shape is similar to that of the preceding, the forehead overhanging the orbits, the frontal and parietal eminences, and the occipital protuberance projecting strongly. The regions between these points are well filled up, giving an even rounded appearance to the sides and back. There is a gap, measuring 9.5 cm. in the transverse by 4.5 cm. in the sagittal plane, in the site of the anterior fontanelle, which has been membranous. There is also a small gap about the middle of the sagittal suture. All the rest of the sutures are filled with bone. There are numerous wormian bones. Circumference, 74.2 cm. ($29\frac{1}{4}$ inches). Diameters—antero-posterior, 23.5 cm.; transverse, 22 cm.; vertical, 20 cm.

50.110. Hydrocephalus. Human.

Hunterian.

A large and well-ossified skull, macerated and dried, showing the above condition. The jaws are badly preserved, but the point of the lower left bicuspid of the second set is just above the level of the alveolus, and the two lower first permanent molars are large (both carious); the condition of the teeth, therefore, corresponds to about the ninth or tenth year. The cranium is almost globular in shape. The frontal eminences and the occipital tuberosity project slightly. The greatest width is between the anterior angles of the parietals. The sutures are all well ossified, with few wormian bones recognizable. There are three small holes in the frontal bone, and another

in the site of the anterior fontanelle, which have been closed by membrane only. The sagittal suture is not recognizable, but at a considerable distance on either side of the median plane there is a distinct suture running from the coronal suture (about 5 cm.) towards the centre of the parietals. Circumference, 63 cm. ($24\frac{3}{4}$ inches). Diameters—sagittal, 20 cm. ; transverse, 18.5 cm. ; vertical, 18.5 cm.

50.111. Hydrocephalus. Human.

Hunterian.

Vault of a very large hydrocephalic skull. The sutures are much less distinct and better closed than in any of the preceding. There is a small membranous area in the site of the anterior fontanelle. The shape in the horizontal plane is a fair oval, there being no undue prominence of the frontal or parietal eminences. Probably from an adult. The greatest breadth is about the parietal eminences. Circumference, 66 cm. (26 inches). Diameters—sagittal 23 cm. ; transverse, 18 cm.

(E) FISSURA ABDOMINALIS (EVENTRATION ; CELOSOMIE). DEFECTIVE FORMATION AND NON-CLOSURE OF THE THORACIC AND ABDOMINAL CAVITIES.

50.112. Hernia into the Umbilical Cord. Human.

Hunterian. MM. 54.

“An umbilical rupture in a child at birth.” A portion of the abdominal wall, with a large bunch of intestines and part of the umbilical cord, injected red. The membranous sac is mostly cut away. It appears clearly to have been formed from the beginning of the umbilical cord.

50.113. Hernia into the Umbilical Cord. Human.

Hunterian. MM. 18.

(Aspalosome.) “A child about the sixth month ; the anterior parietes of the abdomen for some way round the navel are wanting, and in their place peritoneum is stretched out into a bag, in which a considerable portion of the abdominal viscera, equal in size to a small egg, are contained.” The sac is not peritoneum alone, but is a

continuation of the whole somatopleure. The umbilical cord rises from its apex. Male.

50.114. Fissura Abdominalis. Anencephalia and Amyelia.
Human. *Hunterian. MM. 55.*

(Aspalosome.) "A child whose head is bent upwards and sunk between the shoulders; there is a deficiency of brain, the eyes being at the top of the head, and there is a thin bag hanging down from the head behind; the spleen and almost the whole of the intestines are out of the cavity of the abdomen." The vertebral canal is open. Among the intestines are a few shreds of the thin membranous sac in which they had been contained.

50.115. Fissura Abdominalis. Retroflexion of Body and Spina Bifida. Human. *Hunterian. MM. 20.*

(Agénosome.) "A child, female, about the ninth month," with non-closure of the abdomen, and the viscera prolapsed into a membranous sac, which "was very large," but has mostly been cut away. Injected red. All the viscera are readily identified. The end of the small intestine is recognizable by the presence of a vermiform appendix. The great intestine is represented by a wide sickle-shaped diverticulum, about 3 cm. long, which runs up the middle of the abdomen and ends blindly above. Its orifice is at the point where the small intestine and the vermiform appendix join it; and it opens into a cloaca along with three other orifices, by two of which a probe passes to right and left into the two cornua of a bifid uterus, and the third, in front, leads into the urachus, which is dilated into a cavity representing the urinary bladder. The orifices of the ureters could not be found. The Fallopian tubes and ovaries lie close to the lower ends of the kidneys. The external genitals are represented by a little fold of skin on the inside of either leg, at a considerable distance from one another. There is a small spina bifida in the sacral region. The lower half of the body and lower limbs are flexed considerably backwards and to the left. The anterior parts of the pelvic girdle are absent. The posterior part seems to be narrowed and flattened backwards. The femora are thus articulated close together, and the legs are rolled outwards so as to turn the feet backwards and bring their outer sides together as occurs in sympodia. The feet are well formed.

50.116. Fissura Abdominalis. Retroflexion and Spina Bifida. Human. *Hunterian. MM. 21.*

(Agénosome.) "Twin fellow" of the preceding, "with the same deficiency in the parietes and the same bag. Also with the additional circumstance of a large spina bifida behind. (Dr. H.'s Case.)" (History not found.) The arrangement of the viscera is the same as in the preceding, except that the diverticulum representing the great intestine is smaller and the cloaca more closed in. The legs are smaller, and there is talipes varus of the right, and talipes calcaneus of the left foot. The sac of the spina bifida is composed of thick skin, covered with down. No nerve roots are visible in the sac, which appears to be a meningocele. The lower third of the vertebral canal is widely open; its floor is covered by a soft vascular fleshy mass.

50.117. Fissura Abdominalis. Retroflexion and Spina Bifida. Human. *Hunterian. MM. 59.*

(Agénosome.) A monstrosity, very similar to the preceding, of the male sex. The small intestine opens, close to the orifice of a cloaca, into a small round sac, which represents the large intestine. The cloaca is more widely open than in the preceding. From it a probe passes with equal ease into either the sac or the small intestine. On either side of the orifice of the intestine appear the slit-like orifices of the ureters. The testicles are recognizable in the abdomen. There are no external genitals. There is an extreme degree of retroflexion and a large spina bifida. There is double talipes equinus.

50.118. Encephalocele. Fissura Abdominalis. Eventration. Absence of Left Arm. Human. *Hunterian. MM. 6.*

(Pleurosome.) A small female foetus. It has anterior and posterior encephaloceles, no nose, the orbits rudimentary and widely separated, non-closure of the anterior parietes from the left shoulder to the umbilicus, and the abdominal viscera all outside the body cavity. The left arm is totally absent, and the thumb of the right hand. There is double talipes varus of the right, calcaneus of the left foot.

50.119. Extreme Degree of Non-formation of the Abdominal Walls, with Retroflexion and Peropodia.

From Dr. Allen Thomson's Collection.

(Schistosome.) A foetus with large and well-formed head, upper limbs, thorax, and back down to the lower dorsal region. The thoracic viscera are well formed, and the thoracic cavity closed below by a complete diaphragm. At this level the body seems to come to an abrupt end; but, on examination, it appears that an irregular mass tucked up under the left arm represents its lower half and the legs strongly retroflexed and twisted to the left. The upper side of this mass, which is really its back, lies in contact with the left side of the thorax. Its lower edge consists of the anterior surface of the vertebral column covered with peritoneum. The left arm rests in a hollow on the top of the mass (which represents the lower end of the body), and the hollow is the fork of the legs. On the face of the rounded end below the fork of the legs is a little cleft, with a couple of processes like a rudimentary clitoris and its prepuce, which probably represents the external genitals; the sex is not determinable. The left thigh passes upwards and towards the right side, almost in direct continuity with the line of the vertebral column, the knee, which forms its end, almost reaching the face. The leg and foot are represented only by a short spike, which is doubled backwards on the thigh to a very acute angle. The right limb is buried in the body mass, but its outline can be felt through the skin. It consists of a short femur rising from near the same place as the left femur (compare No. 50.115) and passing horizontally backwards. The knee forms a rounded prominence resting on the posterior fold of the left axilla; the tibia is flexed down over the back; its rounded end (marked with a bristle) is felt under the skin about midway between the bend of the spine and the lower end of the body. There is a deep cleft, lined by skin on both sides, between it and the body. The twisting of the spine and inversion of the limbs is an exaggerated degree of the condition seen in the preceding specimen, greatly modified in appearance by the malformation of the limbs. The abdominal parietes are completely wanting, but a membranous fringe hangs down all round from the edges of the thorax and right side of the lower half of the body, enclosing a flat circular area, which is occupied to the right by a large liver with gall bladder, to the left by a small spleen and a single kidney, which is the left one. The liver and spleen hang from the diaphragm; the

kidney lies close to the left side of the vertebral column, filling up the space between it and the liver. There is neither stomach nor intestines.

The vertical glass rod hanging close to the liver marks the umbilical artery, which in this case is the direct continuation of the aorta. The horizontal glass rod marks the umbilical vein, which runs from the left in the line of junction of skin and membrane to the longitudinal fissure of the liver.

(d) *Various Single Monstrosities not includible in the preceding Classes.*

50.120. Congenitally Imperforate Urethra. Human.

Hunterian. MM. 34.

“A child at birth, injected red: the bladder was dilated to an enormous size and full of water, as if there had been an ascites; it had encroached exceedingly on the cavity of the chest.” The urethra is imperforate somewhere about the bulb. The anus is pervious.

50.121. Enormous Congenital Cysts of the Neck.

Hunterian. MM. 45.

“A prodigiously deformed child, with its head and chest buried, as it were, in a large irregular mass of flesh.” The so-called “mass of flesh” has at one time been laid open down both sides, and carefully sewn up again. It consists of two large cysts, one on each side. Between them lies the cranium. There is very marked retroflexion associated with a small eventration. The head is bent back so that the occiput lies well down between the shoulders, and the vertebral column is much shortened. The cranium is of large size, and was filled by a large well-shaped brain. The sutures of the vault are all membranous. The spinal cord enters the cranium unusually far back, and the medulla and portion of cord within it are unusually long. There is no trace of spina bifida.

The cysts are partially divided into loculi by incomplete partitions. They extend from the top of the head down both sides to the border of the last rib. They occupy the whole breadth of the sides of the head and neck; they encroach very little on the back

or on the front of the neck. They begin behind the ears, which are pushed forwards into line with the face, and pass down behind the arms, which are also pushed forwards but not separated from the sides, the cysts not entering into the axillae at all. There is no communication between the cysts, which have almost the whole breadth of the back and cranium between them behind, and a still wider interval in front. Neither could any communication be made out between them and any part of the cavities of the cranium, vertebral canal, meninges, or brain. The cysts are not meningoceles. Most probably they are examples of what is described as congenital hydrocele of the neck, but of very unusual size. They were formerly distended with lard, which was not replaced as it was found that they kept their shape better without it.

SERIES 51.

EMBRYOLOGICAL WAX MODELS.

The series consists of twenty-four cases of embryological wax models to assist professional medical students, by Professor Adolf Ziegler, M.D., Freiburg in Breisgau. Presented to the Museum by Dr. Allen Thomson.

<i>Development of the Ovum,</i>	1-8
<i>Development of Crustacean and Insect Larvae,</i>	9-10
<i>Development of the Chick,</i>	11-17
<i>Development of the Human Embryo,</i>	18-19
<i>Development of Special Organs,</i>	20-24

I. MODELS ILLUSTRATING THE SEGMENTATION OF THE OVUM, AND FORMATION OF THE BLASTODERM AND EMBRYO.

51.1. Segmentation of the Ovum of a Mammal. (After Bischoff.) *From Dr. Allen Thomson's Collection.*

Twelve wax models from a series of twenty-five, illustrating "the first metamorphoses of the fructified ovum of the mammalia," from the first cleavage of the ovum through the various stages of segmentation to the formation of the blastodermic vesicle. The whole ovum undergoes division—holoblastic segmentation. The models are systematically arranged, as regards the colouring, in illustration of the work of Bischoff, *Entwicklungsgeschichte des Hundes und des Kaninchens* (History of Development of the Dog and Rabbit).

51.2. Formation of the Blastoderm and Embryo of a Mammal. (After Bischoff.)

From Dr. Allen Thomson's Collection.

The remaining thirteen models of the same series as the preceding, showing the steps from the formation of the blastoderm and the differentiation of the embryonic area to the first formation of the embryo.

51.3. Segmentation of the Egg of the Frog. (After Ecker.)

From Dr. Allen Thomson's Collection.

The first twelve of a series of twenty-five wax models, illustrating the segmentation of the egg, and the development of the tadpole of the frog (*Rana temporaria*), after Ecker, *Icones Physiologicae. Entläuterungstafeln zur Physiologie und Entwicklungsgeschichte* (Atlas of Physiology and Embryology), Pl. XXIII. This case of models shows complete (holoblastic) and unequal segmentation, the whole ovum dividing into two sets of cells of different size and having different characters.

51.4. Development of the Tadpole of the Frog. (After Ecker.)

From Dr. Allen Thomson's Collection.

Other ten wax models of the same series as the preceding, illustrating the earlier stages in the development of the tadpole.

51.5. Development of the Tadpole of the Frog. (After Ecker.)

From Dr. Allen Thomson's Collection.

The remaining three models of the above series, illustrating the completion of the development of the tadpole from the ovum. No. 21 partly dissected to show the internal and external gills.

51.6. Development of the Egg in the River Trout. (After Oellacher.)

From Dr. Allen Thomson's Collection.

The first ten of a series of twenty-one wax models illustrating the above. The series shows meroblastic segmentation, only a small part of the ovum (the germinal disc) undergoing cleavage to form the blastoderm, the rest remaining undivided as the nutritive part of the egg (yolk). Models 1-10 segmentation.

51. 7. Development of the Egg in the River Trout. (After Oellacher.) *From Dr. Allen Thomson's Collection.*

The remaining eleven models of the same series as the preceding, illustrating the formation of the blastoderm, the differentiation of the embryonic area, and first appearance of the embryo.

51. 8. Four Principal Types of Segmentation of the Ovum and Formation of the Blastodermic Layers by Invagination or Gastrula Formation. (After Haeckel.) *From Dr. Allen Thomson's Collection.*

Twenty-two wax models illustrating the above.

Nos. 1-5. Primordial Segmentation and the Archigastrula. Ovum of *Gastrophysema* (Sponge).

Nos. 6-13. Unequal Segmentation and the Amphigastrula. Ovum of *Fabricia* (Chaetopodous Annelide).

Nos. 14-19. Discoidal Segmentation and the Discogastrula. Ovum of Gadoid (Osseous Fish).

Nos. 20-22. Superficial Segmentation and the Perigastrula. Ovum of a Crustacean.

51. 9. The Metamorphosis of the Echinodermata.

From Dr. Allen Thomson's Collection.

Twelve wax models illustrating the various forms of larvae of the Echinodermata.

I. Pluteus (Larva) of Ophiuroid, with explanatory drawing.

II. Pluteus of *Spatangus*.

III. Pluteus of Ophiuroid.

IV. Bipinnaria of *Asterias* (Asteroid).

V. Auricularia; Larva of Holothuroid.

VI. A Pluteus; species unknown.

VII. Partially dissected Bipinnaria of Asteroid (*Asterias*), with explanatory diagram attached.

VIII. Very young Larva of Asteroid.

IX. Very young Larva of Holothuroid.

X. Simplest Larval Form in the Echinoderms.

XI. Pluteus of Ophiuroid.

XII. Larva of Ophiuroid further developed, with a star-like excrescence on it, which is the beginning of the ambulacral apparatus.

51.10. Development of the Insect from the Ovum. (After Weissmann.) *From Dr. Allen Thomson's Collection.*

Twenty-six wax models illustrating the development of the egg of the Chironomus (Diptera: Insects). Magnified 500 diameters. After the work of Weissmann, *Die Entwicklung der Dipteren* (Development of the Diptera).

II. THE DEVELOPMENT OF THE EMBRYO AND OF SPECIAL ORGANS.

Nos. 51.11 to 51.16 are a set of six cases, containing a set of twenty-three wax models, illustrative of the development of the chick. Presented to the Museum by Dr. Allen Thomson. The full explanation of them will be found in the work of Professor His, *Untersuchungen über die erste Anlage des Wirbelthierleibes* (Researches into the First Development of the Vertebrates), Leipzig, 1868, to which the references to pages apply. The brief descriptions here given are founded on the descriptions in that work, p. 57, where a list of the stages is given.

51.11. Development of the Chick. (After His.) *From Dr. Allen Thomson's Collection.*

Models 1, 2, and 3: Stages 3, 4, and 5.

The First Stage is the differentiation of the layers of the blastoderm.

Second Stage. First appearance of the folding-off of the embryonic area, formation of the primitive streak, central cross streak, its crescentic anterior margin, and medullary folds. These two stages are not represented by models; some of the points are illustrated in Model 1.

MODEL 1. Third Stage. (His.) Sharper differentiation of the embryonic portion from the rest (extra-embryonic portion) of the blastoderm. Differentiation of the lateral plates of the mesoblast (muscle plates). Commencement of organization of the inner layer of the embryo. 18-23 hours. (Page 68 *et seq.*)

MODEL 2. Fourth Stage. Development of the head fold. Division of the mesoblast into splanchnopleure and somatopleure. Elevation of the medullary ridges and formation of the first

primitive vertebra (mesoblastic somite). 24-25 hours. (Page 76 *et seq.*)

MODEL 3. Fifth Stage. Advance of the folding-off of the embryo, closure of the neural canal in progress, formation of a series of primitive vertebrae (mesoblastic somites) behind the first, formation of the tubular heart, growing-in of the processes of splanchnopleure (splanchnopleuric folds). The medullary folds diverge, then draw in again about the end of the primitive streak, which is now less prominent. 26-30 hours. (Page 83 *et seq.*)

The Sixth Stage, which is not represented by a model, is the completion of the primitive vascular system, and commencement of the movements of the heart; formation of the Wolffian body, protrusion of the optic vesicles from the first primitive cerebral vesicle, 30-40 hours, varying as early even as 22 to as late as 56 hours, with differences in the eggs, regulation of temperature, etc. (as His points out).

51.12. Development of the Chick. (After His.)

From Dr. Allen Thomson's Collection.

Models 4, 5, and 6: Stages 5 and 7.

MODEL 4. The same embryo as 3, viewed from below and with part of the hypoblast and splanchnopleure removed, to show the formation of the heart in the coalesced folds of splanchnopleuric layer of the mesoblast. The coalescence of the splanchnopleuric folds also brings about the enclosure of the fore gut for some distance.

MODEL 5. Longitudinal section of 3, showing the head fold, protruding optic vesicles on the side of the fore brain, primitive aorta, and fore gut. The heart is tubular; there is only a single aortic (branchial) arch; the fore gut behind the heart is enclosed for a considerable distance; it is blind anteriorly, the mouth not being formed yet.

MODEL 6. Seventh Stage. Completion of the series of three primary cerebral vesicles, definition of the optic vesicles by narrowing of their stalks, formation of the otic vesicle and otic invagination of the epiblast; lateral curvature of the heart; inclosure of the cephalic end by the growing-up of the amnion. Towards end of second day. (*Loc. cit.*, p. 103 *et seq.*)

51.13. Development of the Chick. (After His.)

From Dr. Allen Thomson's Collection.

Models 7, 8, and 9.

MODEL 7. Same Stage, with parts of the lower layer of blastoderm and fold of the amnion removed to show the under surface of the head and the development of the heart. Compare No. 51.16. The primitive fore gut can be seen running up towards the head, behind the heart, now enclosed to a considerable degree by the union in front of it of the splanchnopleuric folds.

MODEL 8. Same Stage, dorsal layers (epiblast and somatopleuric mesoblast) removed, showing the under layers of the blastoderm—splanchnopleuric mesoblast and hypoblast; in the former the arteries and area vasculosa are in process of formation, and the red blood appearing for the first time in isolated spots (blood islands). Two of the aortic (branchial) arches have been formed.

MODEL 9. Same Stage. Longitudinal section, showing the side view of the cerebral vesicles, heart and arteries, and also the cardinal veins, and the right vitelline (omphalo-meseraic) vein cut across. The right optic vesicle is well defined. Shows also the right portions of the series of mesoblastic somites.

51.14. Development of the Chick. (After His.)

From Dr. Allen Thomson's Collection.

Models 10 and 11.

MODEL 10. Eighth Stage. Commencement of the cranial flexure, formation of the optic cup and lens, appearance of the visceral (branchial) clefts. The tubular heart has become doubled on itself, and the differentiation of the ventricular, auricular, and aortic bulbar portions is quite distinct. See also next model.

MODEL 11. Same Stage dissected, showing the cerebral vesicles, optic cup, otic pit (red), heart, and blood-vessels, three aortic arches complete, and a fourth in process of development. Shows also the intestine—the fore gut with the aortic arches encircling it, commencing invagination of the mouth towards the blind end of the fore gut, and commencing enclosure of the hind and mid guts. Compare No. 51.17.

51.15. Development of the Chick.

From Dr. Allen Thomson's Collection.

Models 12 and 13.

MODEL 12. Ninth Stage. Formation of the posterior visceral (branchial) clefts and bulbus arteriosus, completion of the amnion, commencement of the tail fold. The intestine is considerably more closed in than in the preceding, the buccal invagination large and deep. Third day.

MODEL 13. Same Stage dissected, showing increase in the curvature of the heart, fifth aortic arch in process of formation, the auricles or rather appendices of the auricles evident, the arteries and veins dissected, the vitelline (omphalo-meseraic) vessels cut short. The vesicles of the cerebral hemispheres are developing from the front of the first primary vesicle (fore brain); the invagination and infolding of the primary optic vesicles has made considerable progress. Compare No. 51.22, Development of the Eye.

51.16. Development of the Brain of the Chick. (After His.)

From Dr. Allen Thomson's Collection.

Models 14-17.

The Brain from the 5th, 7th, 8th, and 9th Stages.

MODEL 14. Brain from Fifth Stage, No. 3. The neural canal is not completely closed in front. The first cerebral vesicle is quite formed, though still open in front; the second and third are indicated by constrictions of the neural tube behind it.

MODEL 15. Brain from Seventh Stage, No. 6. The neural canal is completely closed in front; the three cerebral vesicles (fore, mid, and hind brain) are distinctly indicated, and the optic vesicles protruding from the sides of the first.

MODEL 16. Brain from the Eighth Stage, No. 10. The first vesicle is dividing into two, the anterior being that of the cerebral hemispheres, which is at this stage a single vesicle growing out in front of the first primitive vesicle; the cranial flexure is distinct; optic vesicle invaginated. There is dorsal flattening and widening of the third vesicle (hind brain).

MODEL 17. Brain from the Ninth Stage, No. 12. Cranial flexure more marked. The vesicle of the cerebral hemispheres has

now developed into two vesicles which are rising up above the primitive fore brain. The hind brain shows the flattening and broadening corresponding to the fourth ventricle on the top of the pons Varolii, and the prominence at the front of it, which becomes the cerebellum.

51.17. Development of the Heart and Intestines in the Chick. (After His.)

From Dr. Allen Thomson's Collection.

Models 18-23.

(a) Heart from the 5th, 7th, 8th, and 9th Stages.

MODEL 18. Heart from Fifth Stage, No. 3. Junction of the two folds of splanchnopleure and formation of a single tubular heart from the two primitive blood-vessels.

MODEL 19. Heart from Seventh Stage, No. 6. Curvature of the simple tubular heart to the right. At the lower (caudal) end are seen the two vitelline (omphalo-meseraic) veins, coming in from the area vasculosa.

MODEL 20. Heart from Eighth Stage, No. 10. Heart quite doubled on itself, first trace of the auricles, and definition of the bulbus arteriosus from the ventricular portion of the tube. The auricles have now advanced to a level with the cephalic end (afterwards the base) of the heart.

MODEL 21. Heart from Ninth Stage, No. 12. Shape of the adult heart is beginning to be appreciable; auricles quite distinct; four pairs of aortic arches rising from the bulbus arteriosus. Compare No. 51.23.

(b) Development of the Intestines from the 8th and 9th Stages.

MODEL 22. Intestines from the Eighth Stage, No. 10. The fore end is blind; there are indications of two visceral clefts and three visceral folds; the greater part of the intestine is open, and the tail fold just commencing to enclose the hind gut.

MODEL 23. Intestine from the Ninth Stage, No. 12. Connection with the mouth is established; there are four visceral clefts, which are not open to the intestine; further development of the splanchnopleuric folds enclosing the intestine; in the region which

becomes duodenum, two pits which form the liver, and one pit which forms the pancreas; hind gut enclosed in tail fold; anus still imperforate. From behind are seen the groove of anterior oesophageal wall, which becomes the trachea, the two buds for the lungs, and the protrusion of the hind gut which forms the allantois.

51.18. Development of the External Form of the Human Embryo from the Fourth to the Tenth Week.

(After Ecker.)

From Dr. Allen Thomson's Collection.

Five Wax Models illustrating the above.

After illustrations in Ecker's *Icones Physiologicæ, Erläuterungstafeln zur Physiologie und Entwicklungsgeschichte* (Atlas of Physiology and Embryology), Pl. XXVI. and XXVII.

In 1 and 2 (fourth and fifth week) the cranial flexure is extremely great; the body is closed in front, the umbilical cord having been formed (compare Nos. 51.11 and 51.12, Development of the Chick—Folding-off of the Embryo from the Blastoderm); four visceral (branchial) clefts are distinct; the limbs are little buds showing no trace of digits; the tail is not enclosed.

In 3 the digits are indicated; the visceral (branchial) clefts have almost disappeared. About seventh week. The tail still projects.

In 4 the visceral (branchial) clefts have disappeared; the tail is enclosed; the clefts of the face are still open; the eyes are on the front of the head. Eighth week.

In 5 (ten weeks) all the clefts are closed; the cranial flexure is much reduced, and the form generally is approximately that of the mature embryo. The digits are very short, but their joints are indicated. Compare Nos. 48.201 to 48.228, Development of the Embryo in Series 48, Gravid Uterus.

51.19. The Development of the Face in the Human Embryo. (After Ecker.)

From Dr. Allen Thomson's Collection.

Four Wax Models illustrating the above.

After Ecker. ('(Loc. cit., Pl. XXVI. and XXVII.)

In No. 1 there is no likeness to the adult face. The front is occupied by a large gap between the cerebral lobes and the man-

dibular arch; at the corners of this are the maxillary processes. Below the mandibular arch the branchial arches and clefts are distinct. The eyes are on the sides of the head; the lachrymal clefts between the orbits and the buccal cavity are open.

In No. 2 the branchial (visceral) clefts are nearly obliterated; at the ends of the first and second are little pits, the upper of which (otic pit) represents the external auditory meatus. The buccal cavity is much larger, and the tongue occupies its floor behind the mandible. The maxillary process has grown forwards, and the frontal processes downwards; on the latter are seen the nasal pits close to the lachrymal clefts.

In No. 3 the eyes have come round on to the front of the head; the median parts of the nasal processes have developed greatly; the nasal pits are now clefts communicating with the mouth and with the lachrymal clefts, which are now only grooves. There is still a trace of the first branchial (visceral) cleft. The otic pit at the outer end of this cleft has risen up to about the level of the top of the mandibular process.

In No. 4 the various clefts of the face are closed, but still indicated by grooves. The deep part of the lachrymal groove by this stage has been converted into lachrymal duct; the superficial has been obliterated altogether. The point of the nose projects; the intermaxillary process and upper lip are formed; the appearance of the face is approximately that of the adult.

51.20. The Development of the Convolutions of the Human Brain from the Second to the Ninth Month of Pregnancy. (After Ecker.)

From Dr. Allen Thomson's Collection.

Illustrating Ecker's paper, *Zur Entwicklungsgeschichte der Furchen und Windungen der Grosshirn Hemisphären im Fötus des Menschen* in *Archiv für Anthropologie*, Bd. III., 1868 (History of Development of the Fissures and Convolutions of the Hemispheres of the Cerebrum in the Foetus of Man). Also the *Convolutions of the Human Brain*, by Ecker, tr. by John C. Galton, London, 1873.

MODEL 1. The brain of a foetus at the twelfth week. (*Loc. cit.*, Plate I., figs. 1, 2, 3, 5.) Shows that it already has the shape of the adult brain. The hemispheres are quite smooth, except for the

fold due to the bending of the vesicle, which becomes the Sylvian fissure.

MODEL 2. Left half of the same, showing the median surface. (*Ibid.*, fig. 3.) The corpus callosum is hardly fully formed. None of the permanent fissures are visible.

MODEL 3. The brain of a foetus at the fourth month (sixteenth week). (*Ibid.*, Plate I., figs. 6 and 7.) The fissure of Sylvius has become deeper. No trace of any of the other fissures.

MODEL 4. Left half of the same, showing the median surface. (*Ibid.*, fig. 8.) The cut edges of the corpus callosum and fornix are quite recognizable, with the septum lucidum between. In the posterior part of the brain are recognizable the folds which become the parieto-occipital and calcarine fissures.

MODEL 5. A brain of a foetus at the fifth month (19 weeks). (*Loc. cit.*, Plate I., figs. 10, 11, 12.) The Sylvian fissure now shows both its limbs, but the anterior is very short. The fissure of Rolando is well marked, running from near the vertex, outwards, forwards, and downwards, to a point between the limbs of the Sylvian fissure. Posteriorly, the end of the parieto-occipital fissure notches the median edge of the upper surface of the hemisphere.

MODEL 6. Left half of the same, showing the median surface. (*Ibid.*, fig. 13.) Shows the parieto-occipital and calcarine fissures more developed and the rudiments of the calloso-marginal fissure above the corpus callosum.

MODEL 7. A brain of a foetus at the sixth month (23 weeks). (Plate II., figs. 1, 2, 3.) The convolution of the cortex has advanced greatly. In addition to the three main fissures—Sylvian, Rolandic, and parieto-occipital—there are now visible secondary sulci in the middle of the frontal lobe (precentral), in the parietal (intraparietal), in the occipital (sulcus occipitalis transversus), and in the temporo-sphenoidal (first temporo-sphenoidal sulcus) lobes.

MODEL 8. Left half of the same, showing the median surface. (*Ibid.*, fig. 4.) Shows the parieto-occipital, calcarine, and calloso-marginal fissures, and, near the anterior end of the last, one of the minor sulci of the frontal lobe; also on the lower surface of the temporo-sphenoidal lobe the collateral fissure.

MODEL 9. The brain of a foetus at the seventh month (28 weeks) (*Loc. cit.*, Plate II., figs. 6 and 7), showing the same fissures and sulci as the preceding, but considerably extended; the intraparietal

is much larger than in the preceding; there is a second frontal sulcus; the posterior end of the calloso-marginal fissure of the median surface is noticed as a deep notch a little posterior to the upper end of the fissure of Rolando.

MODEL 10. Left half of the same, showing the median surface. Shows the same fissures as No. 8, but more distinctly.

MODEL 11. The brain of a foetus at the eighth month (32 weeks). (*Loc. cit.*, Plate III., figs. 1, 2, 4, 6.) The complexity of the convolutions has increased considerably, but the main fissures and sulci seen in the preceding models are readily traceable.

MODEL 12. Left half of the same (*Ibid.*, fig. 5), showing the median surface; the fissures seen in the earlier models readily traceable.

MODEL 13. Brain of a foetus in the ninth month (36 weeks). (*Loc. cit.*, Plate IV., figs. 1 to 4.) Similar to No. 11, but more complex, from the appearance of numerous minor sulci.

MODEL 14. Left half of the same, showing the median surface. Similar to though more convoluted than No. 12.

51.21. The Convolutions of the Adult Human Brain.

(After Ecker.) *From Dr. Allen Thomson's Collection.*

*Two Wax Models to illustrate the Work of
Professor Ecker.*

Die Hirnwindungen des Menschen nach eignen Untersuchungen, insbesondere über die Entwicklung derselben beim Fötus, Braunschweig, 1869 (The Convolutions of the Brain of Man, especially their Development in the Foetus).

MODEL 1. Model of the cerebrum of the adult. The fissures and convolutions are indicated by letters on the left half, as follows: *Ant.Syl.* Anterior limb of Sylvian Fissure. *Post.Syl.* Posterior Limb of Sylvian Fissure. *Ro.* Fissure of Rolando. *C.M.* Calloso-marginal Fissure (upper end). *P.O.* Parieto-occipital Fissure. *Fr.sup.*, *Fr.m.*, *Fr.i.*, *Fr.asc.* Superior, Middle, Inferior, and Ascending Frontal Convolutions. *Asc.par.*, *S.par.* Ascending and Superior Parietal Convolutions. *Ang.* angular, and *S.M.* Supra-marginal Convolutions. *T.S. 1* and *T.S. 2.* First and Second Temporo-sphenoidal Convolutions. *Oc. 1* and *Oc. 3.* First and Third Occipital Convolutions.

MODEL 2. Left half of the same, showing the median and under surfaces. Fissures and convolutions indicated by letters as follows: *Oc.* Calcarine Fissure. *Oc.* 1. Upper. *Oc.* 2. Lower Limbs of same. *P.O.* Parieto-occipital Fissure. *C.M.* Callosomarginal Fissure. *C.F.* Collateral Fissure. *C.C.* Corpus Callosum in Section. *G.F.* Gyrus Fornicatus. *F.* 1. Median Aspect of First Frontal Convolution. *P.* 1. Praecuneus or Quadrate Lobe. *O.* 1. Cuneus. *D.* Gyrus Descendens. *H.* Gyrus Hippocampi, with the arrow pointing to the Sulcus Hippocampi or Dentate Fissure. *U.* Uncinate Gyrus.

51. 22. The Development of the Eye.

From Dr. Allen Thomson's Collection.

Nine Wax Models illustrating the above.

MODEL 1. The brain at a very early stage, showing the three primary vesicles and the protrusion of the optic vesicles from the posterior parts of the sides of the first.

MODEL 2. Section of a brain and external layers of the embryo at an early stage, showing the optic vesicles becoming flattened exteriorly, and, at a point corresponding to them, the invagination of the epiblast, which goes to form the lens.

MODEL 3. Section of the primary optic vesicle after it has become invaginated with the lens (blue) in the hollow of the cup.

MODEL 4. The optic vesicle and lens (blue) entire, showing the cupping before the lens and the ventral infolding of the primary optic vesicle, which leaves a groove (choroidal fissure) in the lower side of the stalk (optic nerve) and cup.

MODEL 5. The same, with a section taken off the front, showing a cavity in the lens and the cavity of the primary optic vesicle.

MODEL 6. Vertical section of the primary optic vesicle, lens, and external parts covering the front of the eye. Shows (1) the cavity of the optic vesicle much reduced; (2) the space between it and the lens, into which the mesoblastic elements pass, and there form the vitreous; (3) the choroidal fissure, which is formed by the ventral folding of the primary optic vesicle; and (4) the rudiments of the cornea.

MODEL 7. Vertical section of a considerably more advanced eye, showing the thickening of the anterior layer of the optic vesicle,

which alone forms the retina. Compare next model. The lens and cornea are coloured blue; the vitreous and parts connected with the iris and the edges of the choroid pink.

MODEL 8. Vertical section of an eye very much further advanced in its development, coloured like the preceding. The primary optic vesicle is quite collapsed; the outer layer reduced to a thin membrane (the pigmented hexagonal celled layer of the retina); the inner thickened and forming the whole of the rest of the retina. The general relations of the lens, vitreous, cornea, etc., indicated as in the preceding, further advanced towards the mature condition.

MODEL 9. Vertical section of an eye practically fully developed. The cavity of the primary optic vesicle quite obliterated, and the two layers in close apposition with one another. The central artery of the retina is seen passing in along the groove of the optic nerve, which corresponds to the fold of the primitive optic vesicle (choroidal cleft), and running through the vitreous (in this model represented by a cavity) to the back of the lens, in the capsule of which it is distributed. The sclerotic and cornea are shown in a layer of white wax; the latter has acquired its adult shape, and projects as the segment of a smaller circle from the front of the large circle of the eyeball. The choroid and the anterior chamber between the cornea and the lens and iris are shown by a layer of the same pink wax as represents the capsules of the lens and vitreous.

51.23. The Development of the Heart. (After Bischoff and Ecker.) *From Dr. Allen Thomson's Collection.*

Ten Wax Models illustrating the above.

Nos. 1-3 the hearts of embryos of mammalia magnified 70 diameters, after Bischoff's *Entwicklung des Hundes und Kaninchens* (Development of the Dog and Rabbit); Nos. 4-10 represent hearts of embryos of man up to the third month of pregnancy, corresponding with the Ecker's Series, *Icones Physiologicae*, Plate XXX.

No. 4 is magnified 40 diameters.			
Nos. 5 and 9	„	20	„
„ 6 and 7	„	30	„
No. 10	„	8	„

MODEL 1. Shows the stage of a simple (single) tubular heart after coalescence of the two primitive vascular tubes has become complete. The lower end shows the roots of the two omphalo-meseraic (omphalo-mesenteric) veins, the upper the two first aortic (branchial) arches rising from the conus arteriosus; the intermediate part with the two bends is the heart.

MODEL 2. The heart is still in the condition of a single tube with the roots of vessels as in the preceding. It can be seen to consist of four parts: (1) The arterial part—bulbus or conus arteriosus—which is longer than in the preceding; (2) ventricular part below it, formed from the region of the upper bend in model No. 1; (3) auricular portion, formed from the region of the lower bend in the preceding, but which, by the doubling of the tube on itself, is now above the ventricular part. (In this region there is a widening of the tube, for the explanation of which see next specimen); (4) venous part or sinus venosus, formed by the junction of the two omphalo-meseraic veins, which open into the auricular portion.

MODEL 3. The stage of bending of the tube has now reached completion, and that of differentiation into an organ with right and left sets of cavities has begun. The widening of the lower bend (now become the upper or base of the heart) has increased, and a groove has appeared, dividing it into two portions which become the two auricles. The ventricle below them appears still single. The conus arteriosus has increased in length; its branches, the branchial arteries, are not shown. The sinus venosus is as in the preceding.

MODEL 4. The heart of a human embryo, 5 lines in length. (Ecker, *Loc. cit.*, Table XXX., figs. 18 and 19.) The auricles (or, strictly, the appendices of the auricles) are now quite distinct; they occupy the upper part (base of the heart), and are growing round the conus arteriosus in the manner in which they encircle the great vessels in the adult heart. The root only of the sinus venosus is shown, and it appears single. The conus arteriosus, still single, is distinctly defined from the ventricle, which now gives indication externally of approaching distinction of the right and left cavities.

MODEL 5. The heart of a human embryo, 7 lines in length. (Ecker, *Loc. cit.*, Table XXX., fig. 20.) The condition is much the

same as in the preceding, but the four chambers of the heart are more plainly indicated. The trunk of the arteries still shows no sign of division.

MODEL 6. The heart of a human embryo, which measured in the bent condition 9 lines from the second cerebral vesicle to the sacrum. The two auricles are now of large size, forming by far the greatest part of the heart. They encircle the ventricles in front. The arterial trunk is now beginning to be divided by growth of a septum from right and left into its lumen, to form the aorta and pulmonary artery. The sinus venosus is replaced by a short trunk with two branches which represent the superior and inferior venae cavae.

MODEL 7. The ventricular and arterial portions of the same heart opened on one side to show the division of the ventricles by a septum growing up from the apex and sides; this is still far from being complete. The auriculo-ventricular orifice is single and very large.

MODEL 8. The heart from a slightly larger embryo, showing a more advanced but similar condition. The aorta and pulmonary artery still form one stem, but the septum divides it inside completely into two canals. The venae cavae enter the auricle by distinct openings.

MODEL 9. The same heart, the auricle opened from behind, showing it still a single cavity. The ventricular septum extends considerably higher than in the preceding, but in the middle is not yet quite up to the level of the auriculo-ventricular sulcus; at the front, however, it has grown up so high as to have united with the septum between the aorta and pulmonary artery, which now lead directly from their respective ventricles on either side of it.

MODEL 10. The heart of a 3 inch long three months old embryo. (*Loc. cit.*, Table XXX., fig. 29.) Shows the heart practically in the condition which it preserves up to birth. The division of the ventricles is complete; the aortic and pulmonic trunks are distinct up to the point where they communicate by the ductus arteriosus. The actual pulmonary arteries, of very small size, come out under the ductus arteriosus. The auricles are opened, showing two septa, both incomplete, the right of which forms the Eustachian valve in the foetus, and the septum between the auricles in the adult; the

left disappears. The right and left auriculo-ventricular orifices are quite separate, and communicate each with its corresponding ventricle only, the auriculo-ventricular septum on the top of the interventricular septum being complete. The pulmonary veins are seen entering the auricle as in the mature foetus. Compare Nos. 10.31 *et seq.*, Foetal Hearts.

51.24. The Development of the External Genital Organs in Man. (After Ecker.)

From Dr. Allen Thomson's Collection.

Icones Physiologicae, Plate XXIX., figs. 8 to 18 (omitting 16).

Nos. 1 to 4 show the state when the sex is not yet decided.

Nos. 5, 7, 9 the decided female.

Nos. 6, 8, 10 the decided male sexual type.

MODEL 1. The lower part of the body of an embryo six lines in length. (*Loc. cit.*, fig. 8.) In front of the projecting end of the vertebral column there is a little tubercle with an opening on the top of it, which is the common opening of the alimentary, urinary, and genital passages—the orifice of the cloaca.

MODEL 2. The same parts from a slightly older embryo. (*Loc. cit.*, fig. 9.) The orifice of the cloaca is longer. The tubercle in which it lies is much more prominent, and has, besides, a stronger projection in front, which becomes penis or clitoris.

MODEL 3. The same parts from a slightly older embryo $9\frac{1}{2}$ lines long, of about the eighth week of pregnancy (fig. 10). There is still only one orifice—the cloaca. In front of it the projection which becomes penis or clitoris has developed greatly, and from it run back two distinct folds or lips, which become the labia minora. Round about these structures folds of skin have arisen, low before and behind, but forming a prominent lip on right and left, which become the two halves of the scrotum in the male, and the labia majora and mons veneris in the female.

MODEL 4. The same parts from an embryo about 1 inch long. (*Loc. cit.*, fig. 11.) The cloaca is now divided by a band of tissue (which in the male forms the portion of skin between the scrotum and anus, and in the female the perinaeum) into uro-genital sinus in front (ventrally) and anus behind (dorsally). The tubercle which forms the erectile organ resembles a clitoris. The sex is still not distinguishable.

MODEL 5. The same parts from an embryo about 1 inch and 2 lines long, about the tenth week (*Loc. cit.*, fig. 12), in which the female sexual characters are quite decided. The clitoris is large, and projecting like a penis, but the labia majora and minora are quite recognizable as such.

MODEL 6. The same parts from a male embryo about 2 inches long, in the end of the third or beginning of the fourth month (*Loc. cit.*, fig. 13), showing the male type quite decided. The posterior part of the uro-genital sinus has closed by fusion of the two halves of the scrotum—a distinct raphe, which is recognizable throughout life, marking the line of fusion; the anterior part (the urethra) is still an open groove on the under side of the penis.

MODELS 7 and 9. The external genitals from female foetuses at the middle of the fifth and beginning of the sixth months respectively, showing further stages of their development. The clitoris has ceased growing, and is enveloped in the folds of the labia minora. (*Loc. cit.*, figs 14 and 15.) No. 9 shows the hymen developing at the mouth of the genital orifice. See specimens Nos. 44.4 to 44.9 for development of these parts from the sixth month of pregnancy onwards.

MODELS 8 and 10. The external genitals from male foetuses at the middle and end of the fourth month respectively, showing further stages of their development. The penis has gone on growing, and the uro-genital cleft has closed completely, forming the tubular urethra right to its point; the skin folds have swelled out into the two pouches of the scrotum ready for the descent of the testicles, for which see Nos. 42.58 to 42.66.

SERIES 52.

CALCULI AND CONCRETIONS.

Of calculi and concretions the collection contains 331 specimens, which are placed in small boxes in two large glass-topped show cases. A few calculi also appear in other parts of the collection, *e.g.*, under diseases of the liver and gall bladder and diseases of the kidney. They have for convenience been arranged in two series: No. 52, Calculi and Concretions connected with the Alimentary System; and No. 53, Urinary Calculi, along with which are placed Prostatic Calculi. In the old catalogue there is no description of the individual calculi, but merely a brief account of the chief varieties and the number of them present. There is, however, in the museum a set of plates with printed proofs, as well as the original drawings, prepared by William Hunter with a view to a work on calculi which he had projected, but which never reached publication. A number of calculi were identified with the figures on those plates; these are indicated throughout Series 52 and 53 by an asterisk placed before the number. The plate and figure are stated in parentheses at the end of the description as "Hunterian Plate, fig. —." In addition, a few notes (for the most part in William Hunter's handwriting) were found, either in the boxes with the calculi or among the numerous prints and sketches in the museum, which it was possible to identify with certain specimens. All these odd fragments of information have been incorporated with the new catalogue. No MS. of the projected work on calculi was found. Where the history of a specimen was found, it is quoted; where none is given, it is to be understood that none is known.

The classification used agrees in the main points with that of the Catalogue of the Calculi in the Museum of the Royal College of

Surgeons of England; but in the absence of definite information, and considering the small number of the specimens, it was not thought necessary to separate human calculi from those obtained from the lower animals as in that collection.

A short general description is placed before a number of the sections of the two series. In the case of the intestinal concretions, these are founded on the very admirable introductions in the Royal College of Surgeons' Catalogue.

CALCULI AND CONCRETIONS FROM THE ALIMENTARY CANAL AND GLANDULAR STRUCTURES CONNECTED THEREWITH.

<i>Salivary Calculi,</i>	. . . . .	1-4
<i>Biliary Calculi,</i>	. . . . .	5-51
<i>Pancreatic Calculi,</i>	. . . . .	—
<i>Gastric and Intestinal Concretions,</i>	. . . . .	51-151
<i>Concretions from the Vermiform Appendix,</i>	. . . . .	—
<i>Foreign Bodies from the Stomach and Intestines,</i>	. . . . .	152-153

SECTION I.

SALIVARY CALCULI.

52.1. Salivary Calculus.

Two typical salivary calculi of the characteristic blunt spindle shape, about 2 cm. long. Sublingual—from the duct of the submaxillary gland. They are of a sort of cream colour, and rough on the outside. These calculi are composed of phosphate and carbonate of lime and organic matter.

52.2. Salivary Calculus.

Presented by Dr. W. Stewart of Gourock, 1895.

A calculus about the same size as the preceding, but rather thicker, removed from the duct of the submaxillary gland of an old woman. A similar calculus had been removed from the same duct ten years before.

52.3. Salivary Calculus.

An unusually large calculus, "from salivary duct, sublingual,

received from Mr. Johnstone, Cowcaddens." From the duct of the submaxillary gland. (About 1840.) It is of oval shape, flattened in one direction, and measures 2·8 by 1·3 cm. It is of yellowish-cream colour, its surfaces finely tuberculated.

52.4. Salivary Calculus.

Similar to No. 52.2, but slightly larger.

SECTION II.

BILIARY CALCULI OR GALL STONES.

Of this genus of calculi, the series contains forty-seven specimens, which are classified as follows:—

<i>Crystalline Cholesterine Calculi,</i>	. . . . .	5-14
<i>Laminated Cholesterine Calculi,</i>	. . . . .	15-31
<i>Pearly Faceted Gall Stones,</i>	. . . . .	32-34
<i>Common Gall Stones,</i>	. . . . .	35-43
<i>Bile Pigment (Bilirubin Calcium) Calculi,</i>	. . . . .	44-51

See also Series 38, Diseases of the Liver and Gall Bladder, Nos. 15 to 25.

DIVISION I.

Calculi composed of Crystallized Cholesterine—Pure or with only Traces of Bile Pigment (Bilirubin Calcium).

*52.5. Crystalline Cholesterine Gall Stone. *Hunterian.*

Portion of a large stone (the rest absent) cut across its long axis. It measures 3 cm. in its transverse diameter. It consists of practically pure cholesterine in radiating crystals, the crystalline formation extending almost uninterrupted from centre to surface. The traces of bile pigment material are in the form of one or two concentric rings of a dark brown colour, at some distance from the centre. Its exterior is like beeswax, rather dirty with age, and with patches of dark bile pigment stained material, which is most abundant on the end. It has a smooth waxy feeling. It is slightly tuberculated, as if moulded by the honeycomb-like mucous mem-

brane of the gall bladder. It is considerably heavier than water; sinks rapidly. (*Hunterian Plate I., fig. 3.*)

52.6. Crystalline Cholesterine Gall Stone. *Hunterian.*

The two portions of a similar but much smaller calculus. It has a small dark centre of bilirubin calcium. Sinks rapidly in water.

***52.7. Crystalline Cholesterine Gall Stone.** *Hunterian.*

Portion of a very beautiful calculus, of oval shape, 2·5 by 1·7 cm., of clear translucent crystalline cholesterine, with hardly a trace of pigmentary matter. It has been broken instead of cut, which shows its structure better. Sinks rapidly in water. (*Hunterian Plate I., fig. 9.*)

***52.8. Crystalline Cholesterine Gall Stone.** *Hunterian.*

Half of a similar but larger stone, 2·8 by 2 cm.; the translucency of the central parts is lessened by the presence of a little biliary colouring matter among the cholesterine crystals. "This concretion was taken out of the gall bladder of Dr. Robt. Taylor, and given to me by Sir Edward Wilmot, 1762. The surface was pretty smooth, yet had some flat and unequal granulations. Its colour pale and transparent, with a little of a greenish tint. When cut through, as in this figure, it was all of the same kind, viz., pale and transparent (but most so in the outer half of each radius); not laminated, but made of crystals like spermaceti, shooting from the centre to the circumference. There were some empty interstices in the inner half. Sank in water even when dry." (Does so still.) (*Hunterian Plate I., fig. 8.*)

52.9. Crystalline Cholesterine Gall Stone. *Hunterian.*

Portion of a similar stone, broken, showing the whitish glancing crystallizations. Sinks in water. "John Bryson's stone, which was thrown up by vomiting several years ago. He hath had very good health since. Before he threw it up he had been soundly drubbed and frightened out of his wits. 1741. Mr. Muir of Glasgow."

52.10. Crystalline Cholesterine Gall Stone. *Hunterian.*

Portion of a stone very like No. 52.8. Its outside is dark from a deposit of bilirubin calcium among the tubercles. Sinks in water.

52.11. Crystalline Cholesterine Gall Stone. *Hunterian.*

Portion of a small globular calculus, broken, showing similar characters. There is a good deal of pigment among the crystals of the centre. Laminated towards the outside. Sinks in water.

52.12. Crystalline Cholesterine Gall Stone. *Hunterian.*

A small oval calculus, broken, showing beautifully distinct long radiating crystals. It is covered with a soft yellowish amorphous layer of bilirubin calcium mixed with traces of cholesterine. Sinks slowly in water.

52.13. Crystalline Cholesterine Gall Stone. *Hunterian.*

A half of a globular stone of moderate size, coated with a thin layer of bilirubin calcium. Sinks in water.

52.14. Cholesterine Gall Stone. *Hunterian.*

Two large calculi, uncut, composed largely of cholesterine. The two fit into one another by faceted ends. Together they form a long oval mass the shape of the gall bladder, measuring 5 by 2.7 cm. The exterior is pale yellow like beeswax—pure cholesterine; the faceted ends show a coating of bile pigment matter (bilirubin calcium) mixed with cholesterine. Apparently of the same class as No. 52.5, but floats freely in water, therein resembling the stones of the next class.

DIVISION II.

Mixed Gall Stones, of Cholesterine and Bilirubin Calcium combined in various proportions and arrangements.

(A) LAMINATED CHOLESTERINE CALCULI.

Consisting, for the most part, of cholesterine (a crystalline mass of which usually forms the centre), more or less darkly coloured by admixture with a varying amount of bilirubin calcium.

***52.15. Laminated Cholesterine Gall Stone.** *Hunterian.*

A large oval gall stone, 3·2 by 2·3 cm., consisting almost entirely of cholesterine. The centre is very dark loose bilirubin calcium mixed with cholesterine. Round this is a thick layer of beautiful clear crystalline cholesterine, which shows traces of lamination, then several distinct thin laminae of bilirubin calcium and cholesterine, which appears to be amorphous. The outermost shell consists of pure cholesterine. It just floats in water. "Gall stone from Mr. Jessing, passed (without any jaundice or great pain) by a woman of 60, who lived in good health two or three years afterwards and then died of an apoplexy" (*Hunterian Plate I*, fig. 10.)

***52.16. Laminated Cholesterine Gall Stone.** *Hunterian.*

Half of a very similar calculus. The lamination is very distinct about the ends, but towards the middle the crystallized cholesterine extends right to the edge. The bile pigment matter forms several distinct strata. It floats in water easily. (*Hunterian Plate I*, fig. 5.)

***52.17. Laminated Cholesterine Gall Stone.** *Hunterian.*

The two halves of an oval calculus of similar character. The centre is a small crystalline stone with a good deal of the dark bilirubin calcium in its centre, but the bulk of the calculus consists of very fine concentric wavy laminae of all shades (from waxy white and yellow to dark brown), according as the cholesterine or the pigment matter predominates. (*Hunterian Plate I*, fig. 1.)

52.18. Laminated Cholesterine Gall Stone. *Hunterian.*

A large stone, uncut, apparently of the same class as the preceding. Its ends are faceted. A small cut surface shows the characteristic lamination. It is very heavy and unlike the preceding stones of this character; it sinks in water. It is of dark brown colour from the presence of a large amount of bilirubin calcium.

52.19. Laminated Cholesterine Gall Stone. *Hunterian.*

A faceted gall stone of considerable size, broken into three pieces, showing the crystalline structure of the central and the

laminated structure of the outer parts. The fractured surface shows a shading off from the large crystals of the centre into smaller crystals in the inner laminae and a decidedly amorphous appearance of the cholesterine in the outer narrower laminae. In colour its layers vary from yellowish white to brown; externally it is of a rich brown colour. Consists of almost pure cholesterine. Just floats in water.

***52.20. Laminated Cholesterine Gall Stone.** *Hunterian.*

Half of a beautiful little calculus composed of fine laminae of various colours (from waxy pale yellowish white to brown) of nearly pure cholesterine, which is for the most part distinctly crystalline, deposited round a small hollow nucleus of loose crystalline cholesterine mixed with bilirubin calcium. Its outside is faceted, in colour yellow, polished to a pearly lustre. It is a very dense stone, and sinks rapidly in water. "This concretion Dr. Walker has examined, and finds to be perfectly similar to the agate, viz., a cavity in the centre, surrounded by a mass of crystals with their points directed inwards, shooting from a circular basis, which is surrounded by a number of concentric laminae, and these intersected by radii passing from towards the centre outwards or towards the circumference. The laminae of this concretion of different colours as in agate." (*Hunterian Plate I., fig. 14.*)

52.21. Laminated Cholesterine Gall Stones. *Hunterian.*

A boxful of similar calculi, dense and finely laminated. Sink in water.

52.22. Laminated Cholesterine Gall Stones. *Hunterian.*

A boxful of small dark brown calculi, consisting of cholesterine with a considerable amount of bilirubin calcium intimately mixed with it. Externally faceted and smooth, but not polished.

52.23. Laminated Cholesterine Gall Stones. *Hunterian.*

Four faceted but not polished brown calculi, one broken showing its structure. It consists of a small centre of loose crystalline cholesterine and bilirubin calcium, and outer parts of dense laminae of the same materials, of varying shades (from pale yellow to dark brown). Sink in water. About the size of hazel nuts.

52.24. Laminated Cholesterine Gall Stones. *Hunterian.*

A boxful of similar stones of very various sizes, faceted, but rather rough on the outside. Finely laminated. Sink in water.

52.25. Laminated Cholesterine Gall Stones. *Hunterian.*

Four faceted stones in appearance very like No. 52.23, but in section showing less of the dense laminated matter, and a relatively large centre of loose textured crystalline cholesterine and bilirubin calcium. Just float in water.

52.26. Laminated Cholesterine Gall Stones. *Hunterian.*

A boxful of similar small calculi. Yellow and polished on the outside. Float in water.

52.27. Laminated Cholesterine Gall Stones. *Hunterian.*

Two similar calculi, but of considerable size, measuring fully 2.5 cm. in diameter. Very decidedly faceted and smooth, but for the most part not polished. Float in water.

52.28. Laminated Cholesterine Gall Stones. *Hunterian.*

Three calculi of deep brown colour and glossy like a chestnut, one of them broken showing the internal structure. Float in water.

52.29. Mixed Cholesterine Gall Stones. *Hunterian.*

Several faceted calculi, broken to show structure, consisting almost entirely of cholesterine which is throughout of a very brown colour from the presence of bile pigment matter. One or two are hollow with the points of the crystalline cholesterine pointing into the centre; the others have a centre of loose bilirubin calcium. The outer parts are laminated. Float in water.

52.30. Mixed Cholesterine Gall Stones. *Hunterian.*

A number of small irregular brown calculi, consisting of cholesterine crystals mixed with a large amount of bilirubin calcium. Float in water.

52. 31. Mixed Cholesterine Gall Stones.*Hunterian.*

Two and a half calculi of similar composition, showing an unusually rough tuberculated exterior. Float high in water.

(B) PEARLY FACETED GALL STONES.

These consist of a centre of bilirubin calcium mixed with cholesterine crystals and a shell of laminated pure cholesterine, which becomes beautifully faceted and polished from the stones occurring in large numbers, and being rubbed on one another, in the gall bladder. The structure and composition essentially the same as that of the calculi in the preceding class. See also Series 38, Nos. 15 and 16, the former of which is a gall bladder packed with calculi exactly similar to those forming this subsection.

52. 32. Pearly Faceted Gall Stones.*Hunterian.*

Eleven beautiful pearly faceted calculi of polygonal shapes, with sharply cut faces all about the same size, measuring about 15 mm. in the largest diameter, mounted in a glazed wooden show-case. Along with them is a letter addressed to "Dr. Hunter, Windmill Street, Piccadilly," giving the following account of them. "Mrs. Hawker, Whitechapel, was ill about six months—without any jaundice or symptoms of gall stones—aged about 44, gradually became hard and pained, and contracted on the right side of the abdomen. She consulted me, when I found her emaciated and extremely weak and contracted, and a great swelling with fluctuation. I advised that a surgeon should open it. Mr. Warner did. The discharge was prodigious. About four days after one gall stone worked out and lay upon the poultice; another some days after. About four months after—the sore still open—when she had walked too much she was in pain, put on a poultice, and in the morning seven of these stones lay upon the poultice. It healed and opened several times, especially upon taking cold." The calculi are of a clear pearly yellowish white colour; they are very light, floating high in water. They are all whole. For the internal structure of such calculi, see the succeeding specimen and No. 38.16.

52. 33. Pearly Faceted Gall Stones.*Hunterian.*

A boxful, about 130, of small calculi of very similar appearance to the preceding, but very much smaller. Their faces, from five to eight

in number, and their edges are sharply cut and polished. Several of them are split, showing the centre of dark brown bilirubin calcium mixed with cholesterine crystals, forming about half of the calculus, surrounded by a narrow layer of white crystalline cholesterine, outside which is a thin lamina of loose white opaque cholesterine and the outer shell of very dense translucent white cholesterine, which appears, under a considerable magnifying power, to be quite amorphous. In a stone of 7.5 mm. this shell is less than .5 mm. in thickness. Now, after drying for over a century, they just float in water. The similar stones in No. 38.16 were said to sink even when dry.

52.34. Pearly Faceted Gall Stones in Process of Formation.

Hunterian.

A number of small calculi of various irregular shapes, more or less rounded, but with distinct facets, mottled brown and pearly grey in colour. In section they are seen to consist of a large centre of bilirubin calcium mixed, especially in its outer parts, with crystals of cholesterine, enclosed in a thin shell of dense white cholesterine, through which the brown centre is visible more or less clearly according to its thickness, giving the mottled appearance. Float in water. Clearly belong to the same class as the preceding.

(C) COMMON GALL STONES.

Calculi of very various sizes and shapes, mostly faceted, consisting of a central stone of one or other of the preceding classes (mostly the crystalline cholesterine stones), covered with a layer of bilirubin calcium of varying thickness.

52.35. Common Gall Stone.

Hunterian.

A very large calculus cut in two, of irregular cubical shape, more or less faceted on the sides and with a deeply concave facet on either end. Measures fully 3 cm. on all sides. It consists of a large, nearly pure, globular crystalline cholesterine gall stone, 2.5 cm. in diameter, enclosed in a shell of nearly pure bilirubin calcium from 2 to 5 mm. thick. Sinks easily in water.

52.36. Common Gall Stones.Hunterian.*

Two large gall stones similar to the preceding in composition and structure, divided longitudinally (half of the smaller absent). They fit into one another by a facet on their wide ends, and together they form a long oval mass, 6 by 2.8 cm., which filled the whole gall-bladder. (*Extra Hunterian Plate*, figs. 7 and 7a.)

52.37. Common Gall Stone.*Hunterian.*

The two halves of a very similar stone of much smaller size. Crystalline part, 1.2 cm.; bilirubin calcium part, 3 mm. Sinks in water.

52.38. Common Gall Stone.*Hunterian.*

A similar stone, uncut. Floats in water.

52.39. Common Gall Stone.*Hunterian.*

Half of a similar stone which shows the peculiarity of a very thin shell of translucent pearly cholesterine outside the bilirubin calcium layers, varying in thickness and giving it a mottled appearance, from a pearly *café au lait* to deep chestnut brown colour.

52.40. Common Gall Stone.*Hunterian.*

Half of a small calculus consisting of a small centre of pure crystalline cholesterine, with a thin shell of bilirubin calcium. Sinks in water.

52.41. Common Gall Stones.*Hunterian.*

Portions of two similar calculi, broken. Sink in water.

52.42. Common Gall Stone.Hunterian.*

Half of a calculus, consisting of a fairly pure crystalline cholesterine gall stone, surrounded by a thick layer of very pure laminated bilirubin calcium of deep brown colour. This layer has crumbled away to a considerable extent, apparently through the ravages of mites. Floats in water. (*Extra Hunterian Plate*, fig. 5.)

52. 43. Common Gall Stone.*Hunterian.*

Two dark brown calculi about the size of hazel nuts—one broken—showing the centre a laminated cholesterine gall stone, with a good deal of brown pigment matter in it, enclosed in a thin shell of nearly pure bilirubin calcium.

(D) BILE PIGMENT GALL STONES.

Calculi for the most part of small size, of dark colour, rich reddish brown, dark greenish brown, or black; consisting almost entirely of bilirubin calcium with traces of other bile pigments, and mucus. Before the blowpipe a fragment of them swells up into a black charred mass, catches fire, and burns with white flame, and the black organic matter burns away, leaving a little white ash of carbonate of lime, insoluble in water, but effervescing with hydrochloric acid.

52. 44. Bilirubin Calcium Gall Stone.*Hunterian.*

An oval not faceted calculus, measuring 2 by 1.3 by 1 cm., of dark, almost black colour, formed in concentric laminae. "From Mr. Smart, taken from a woman about 50, with a diseased pancreas and uterus, without any gall stone symptoms." Sinks like a stone in water.

52. 45. Bilirubin Calcium Gall Stone.*Hunterian.*

A similar slightly larger calculus, of dull reddish brown colour and more loosely laminated. Just floats in water.

52. 46. Bilirubin Calcium Gall Stone.*Hunterian.*

A small calculus, rough and tuberculated like a mulberry calculus, broken on one side; externally drab colour, internally black. Sinks in water.

52. 47. Bilirubin Calcium Gall Stone.*Hunterian.*

Two black oval calculi; their surfaces are in part covered with a thin layer of inorganic matter of whitish colour. Sink in water.

52.48. Bilirubin Calcium Gall Stone.*Hunterian.*

Five grey calculi of irregular shape, consisting of bilirubin calcium enclosed in a very thin shell of cholesterine, somewhat resembling that of the pearly calculi, Nos. 32-34. Float in water.

52.49. Bilirubin Calcium Gall Stones.*Hunterian.*

Four faceted, almost black calculi, of shining resinous appearance and laminated structure. Float in water.

52.50. Bilirubin Calcium Gall Stones.*Hunterian.*

A boxful of small faceted, shining greenish black calculi, in appearance very like the preceding, but harder and denser. Sink in water.

52.51. Bilirubin Calcium Gall Stones.*Hunterian.*

Four shining rounded calculi, black mottled with brown, about the size of pigeon peas. Sink in water.

SECTION III.

PANCREATIC CALCULI.

See No. 38, 26.

SECTION IV.

GASTRIC AND INTESTINAL CONCRETIONS.

This section of Series 52 contains 100 specimens, for the most part from the lower animals. Gastric and intestinal concretions are rare in human beings, but fairly common in the lower animals. There is a cast of a ball of hair from the human stomach (No. 52.57), but with this exception all the concretions which have a known history are from the lower animals. It is probable, however, that some of the oat-hair concretions were from human beings, as they closely resemble those in the Royal College of Surgeons of England, which are known to have been taken from human beings. "Indeed, the only kind of intestinal concretion to which man can be said to be

liable is the oat hair concretion described by Dr. Wollaston, and this only occurs in persons who live chiefly upon undressed oatmeal" (*Catalogue of Calculi*, p. 192), and these appear to be much less common now than they were a century ago, probably from the improvements in the dressing of oatmeal, and the decreased use of it as a food.

A very interesting historical account of the miraculous curative powers which were formerly attributed to the varieties of intestinal concretions called Bezoars, and discussion of the nature and origin of intestinal concretions in general is to be found in the *Catalogue of Calculi* in the Royal College of Surgeons of England (ed. 1842-45), pp. 204 *et seq.* In regard to Bezoars it is stated that "It is not easy to determine at what period Bezoars were introduced as medicinal remedies, although there is no doubt that they were first employed by the Arabian physicians. No mention of them is to be found in the ancient Greek and Latin authors. Nicolaus Monardes informs us that their use was first recommended by Serapion, Avicenna, Averroes and Avenzoar, names which would carry us back to the beginning of the tenth century. From the East the use of these bodies as a medicine gradually spread into Europe, where they enjoyed so much reputation that they gave the name of Bezoardics to a large class of pharmaceutical preparations supposed to be peculiarly efficacious in counteracting the effects of poison. These substances were usually of a cordial and tonic nature, although several, as the Bezoarticum mercuriale, etc., must have been very active remedies. A severe blow was dealt to the reputation of the Bezoar as an antidote to poison by the experiment of Ambrose Paré, who administered it to a criminal condemned to death, and to whom arsenic had been previously given, with what result it is scarcely necessary to add. As a pharmaceutical agent, however, it continued to be employed in combination with other drugs for a considerable time. In Pomet's *Histoire des Drogues*, published in 1735, a whole chapter is devoted to the history and uses of Bezoar; and it is only within the last century that it has been expelled from our own Pharmaceutical Codex, as the mode of preparing the powder of Bezoar is to be found in the *London Pharmacopoeia* for 1746." (*Loc. cit.*, p. 207.)

Intestinal concretions always contain a large quantity of animal matter diffused throughout them. From the earthy ones it separates in thin layers when the salts are dissolved out by an acid. They usually have some foreign body, such as a pebble, nail, fruit stone, or

piece of wood for their nucleus. They are more common in herbivorous than in omnivorous animals. In carnivorous animals they have never been observed. The nature of the food when considered along with the materials of which these concretions are formed, the complication of the stomachs of ruminants, and the large size and length of the alimentary canals of herbivora in general sufficiently explain this circumstance. They are all derived from some indigestible constituents of the food, and are not products of secretion, as are biliary or urinary calculi. They are classified as follows :

<i>Concretions consisting principally of Animal Hairs,</i>	52-70
<i>Concretions consisting principally of Vegetable Hairs,</i>	71-89
<i>Concretions consisting principally of Ellagic Acid</i> <i>(Oriental Bezoar),</i>	90-100
<i>Concretions consisting principally of Resino-bezoardic</i> <i>Acid (Occidental Bezoar),</i>	101-108
<i>Concretions consisting principally of Phosphate of</i> <i>Magnesium and Ammonium,</i>	109-135
<i>Concretions consisting principally of Phosphate of</i> <i>Magnesium,</i>	—
<i>Concretions consisting principally of Phosphate of</i> <i>Calcium,</i>	136-149
<i>Concretions consisting principally of Oxalate of Calcium,</i>	150-151
<i>Foreign Bodies from the Stomach and Intestines, .</i>	152-153

DIVISION I.

Concretions consisting principally of Animal Hairs.

The hairs which are swallowed by animals while licking themselves frequently become felted together in the alimentary canal, and form solid masses commonly known by the name of hair balls. They are usually of spherical shape, sometimes considerably flattened almost to circular disc shape, sometimes oval. They attain considerable size, the largest in the collection measures 37 cm. (about 15 inches) in circumference, but there is one from a cow in the Royal College of Surgeons Museum which measures 40 inches in circumference. In some of these concretions the hairs appear on the exterior, and owing to the rotatory motion which the calculus undergoes in the stomach or intestine they become disposed in a very regular manner with their points in the same direction round

the long axis, (*vide* No. 52.52). Others are coated with a thin hard shell which consists of phosphates, chiefly of calcium, some triple phosphates, and traces of the earthy carbonates mixed with organic matters, mucus, etc. In some of the calculi there are also vegetable fibres. Those that are cut show the hairs in the central parts less closely felted than at the exterior. None of them have a foreign body for a nucleus.

52.52. Hair Ball from the Stomach of the Cow. *Hunterian.*

A very perfect example of the above concretion mounted in a glass jar. It is composed of closely felted brown hairs, which are recognizable under the microscope as cow's hairs. It is of spherical shape slightly lengthened in one diameter, which may be called its axis; it measures 9 cm. in this diameter and 8 cm. in its lesser diameter. The hairs of the outer layer are laid in circles around the axis with their points all in one direction as described in the introductory paragraph.

52.53. Hair Ball from the Stomach of the Cow. *Hunterian.*

A similar concretion, slightly larger; in shape a much flattened sphere, measuring 11.5 cm. in the long by 6 cm. in the short diameter.

52.54. Hair Ball from a Camel. *Hunterian.*

A ball of loosely felted brown hair about the size of a hen's egg. "From a Camel. Mr. Forbes."

52.55. Hair Ball from a Calf.

A concretion about the size of No. 52.57 and of similar nature, but badly moth-eaten, which spoils its appearance. "Presented by Mr. Jenkins, from Mr. Alexr. Forsyth, flesher. Found in the intestines of a calf."

52.56. Hair Balls from the Cow. *Hunterian.*

Three hair balls—one globular, the other two thick circular disc shaped—similar to the preceding. One of them shows a considerable admixture of vegetable matter, chiefly bits of hay and straw. Moth-eaten.

52.57. Cast of Human Hair Ball from the Stomach.*Dr. Paterson, Glasgow.*

Described as a "Cast of a mass of human hair found in a lady's stomach." Its shape is roughly that of the cavity of the stomach when moderately distended. The lesser curvature is small, so that the parts corresponding to pylorus and cardia are close to one another. It measures in straight lines 16.5 cm. from the cardiac to the pyloric end, 15 cm. from the highest point of the cardiac end to the lowest point of the greater curvature, and 6 cm. from back to front at its thickest part. It must have filled the stomach very completely.

52.58. Coated Hair Ball.*Hunterian.*

Half of a concretion of closely felted black hair enclosed in a thin, polished dark brown shell of hard material composed of the ends of the hairs cemented together by hard inorganic material—mixed phosphates, principally of calcium, and traces of carbonate of calcium. 6.5 cm. in diameter.

52.59. Coated Hair Ball.*Hunterian.*

Half of a similar but smaller concretion in a glass jar.

52.60. Coated Hair Ball.*Hunterian.*

An oval ball of black hair with a thick shell of hard brown material like hardened faeces, which is composed of mixed phosphates, principally of calcium, some calcium carbonate and organic matter—mucus, etc.

52.61. Coated Hair Ball.*Hunterian.*

A large round hair ball said to be "from a horse," uncut. The shell is of dark brown colour, smooth and polished. 10 cm. in diameter.

52.62. Coated Hair Balls.*Hunterian.*

Two concretions of the same kind, the shell of one very thin, showing the agglutinated hairs quite distinctly; that of the other is about 2 mm. thick. 10 cm. in diameter.

52.63. Coated Hair Ball.*Hunterian.*

Another of the same, cut to show structure.

52.64. Coated Hair Ball.*Hunterian.***52.65. Coated Hair Ball.***Hunterian.***52.66. Coated Hair Ball.***Hunterian.*

Another of the same, smaller, 7 cm. in diameter.

52.67. Coated Hair Balls.*Hunterian.*

Similar to the preceding. One round, 5 cm. in diameter; the other oval, 7 cm. by 5 cm.

52.68. Coated Hair Balls from Sheep.*Hunterian.*

Two concretions exactly similar in appearance to the preceding, but much smaller. 3 cm. in diameter.

52.69. Coated Hair Ball.*Hunterian.*

Similar to the preceding. Cut.

52.70. Coated Hair Ball.*Hunterian.*

Similar to the preceding.

DIVISION II.

Concretions consisting of Vegetable Hairs.

“The concretions found in the large intestines of the human subject are generally composed of the small hairs which are attached to the summit of the oat-seed (*Avena Sativa*). They are not, however, of very common occurrence, being for the most part confined to the labouring classes of Scotland and of some of the northern counties of England, where oatmeal forms a large portion of their daily food.

"These concretions are irregular in form and size. They are frequently as large as the fist, and of a dirty white or light brown colour. Their external surface is smooth, and they are exceedingly light. When divided they are found to consist of concentric layers of a fibrous substance closely felted together, having a velvety feel, between which are often to be observed thin white layers consisting of the earthy phosphates. A piece of bone, a plum- or cherry-stone usually constitutes their nucleus.

"Dr. Mouru, whose father has made a large collection of those calculi, has given an elaborate history of them in his *Morbid Anatomy of the Gullet*. We are informed by him that they were considered by Morgagni as similar in composition to biliary concretions, while others, as Van Swieten, Richerand and Callisen, were of opinion that they consisted simply of indurated faeces. These calculi were analyzed by Cadet without success, and also by Dr. Thomson, who detected in them small quantities of various saline and earthy substances, but was unable to determine the nature of the vegetable matter which constituted the bulk of the calculus and gave to it its peculiar characters. Their composition remained unexplained until one of the concretions was shown to Dr. Wollaston, who 'found the velvety substance to consist of extremely minute vegetable fibres or short needles pointed at both ends, which he immediately conjectured to arise from some kind of food peculiar to Scotland.' For some time, however, he failed in his attempts to trace this substance to its origin. But the ingenious Mr. Clift, of the College of Surgeons, to whom the subject was mentioned in conversation, having put the question whether this fibrous substance might not proceed from oats, Dr. Wollaston was induced to examine the structure of this seed, and the result fully verified Mr. Clift's conjecture. If the oat-seed be denuded of its husk, minute needles or beards forming a small brush are seen planted at one of its ends. Dr. Wollaston, on examining these and comparing them with similar ones detached from the calculi and forming the velvety substance in question, satisfied himself of their perfect identity." (*Catalogue of Calculi*, R.C.S., Eng., p. 193.) Portions of the paleae and husks of the oat and other vegetable fibres are also found in these concretions. "The small hairs which cover the surface of most plants occasionally become felted together in the alimentary canal of herbivorous animals, and form concretions similar in most respects to those already described as occurring in the human subject."

“These concretions do not possess any regular appearance or structure; some are nothing more than a mass of vegetable, earthy matter, etc., confusedly aggregated together, while others possess a laminated structure, and have a soft velvety feel. In addition to the vegetable hairs, of which the bulk of the concretion usually consists, portions of cellular tissue, woody fibre, and spiral vessels are to be found mixed with gum, resin, and an extractive matter resembling ulmic acid, together with various saline and earthy salts, sand, and the hairs of the animal. They also contain variable quantities of more or less altered bile, which appears to have been absorbed by the concretion and become decomposed.” “In the horse these concretions usually occur in the caecum and colon. They frequently contain large quantities of phosphate of lime and magnesia, with undigested food, etc., and are termed by farriers dung-balls. Horses not uncommonly suffer from the presence of these concretions, and they sometimes produce rupture of the intestines.” (From the *Catalogue of the Calculi* in the Royal College of Surgeons of England, pp. 193-195, and p. 221.)

52.71. Oat Seed Concretion.

Hunterian.

A concretion which on microscopic examination was found to consist of minute vegetable hairs, in appearance identical with the setae of the oat seed described in the introduction. The calculus is of oval shape, measuring 7 by 5 cm.; of light brown colour, smooth and velvety to the touch, fairly light for its size, and to the eye composed of very closely felted fine hairs. It is divided transversely. The cut surface for the most part presents identical characters. There is one narrow ring of earthy matter, and the centre is a large fruit stone, like that of a peach.

52.72. Oat Seed Concretions.

Hunterian.

Two cube-shaped concretions of similar characters and composition, uncut. They are very light. Measure 3.2 to 3.5 cm. on the sides—almost a fair cube.

52.73. Oat Seed Concretion.

Hunterian.

A similar calculus, cut. There is a little bunch of coarser fibres which seems to form the nucleus. Beside this a small cavity. Very light.

52.74. Oat Seed Concretion.Hunterian.*

Half of a calculus of similar composition ; of irregular ovoid shape, measuring 7 by 4 cm. It is heavier than the preceding from the presence of numerous narrow strata containing a considerable amount of inorganic matter mixed with the hairs ; this is principally fusible earthy phosphates. (*Hunterian Plate III.*, figs. 1 and 2.)

52.75. Oat Seed Concretions.*Hunterian.*

Two small concretions cut, the one showing a centre of tough organic matter coated with earthy matter.

52.76. Oat Seed Concretion.Hunterian.*

A similar calculus, of small size, cut, showing the centre a fruit stone. (*Hunterian Plate IV.*, figs. 5 and 6.)

52.77. Oat Seed Concretion.Hunterian.*

A similar calculus, the size of a chestnut, cut, showing a fruit stone in the centre. (*Hunterian Plate IV.*, figs. 3 and 4.)

52.78. Oat Seed Concretions.*Hunterian.*

Two similar concretions, cut, differing from the last in being apparently of the same composition, viz., oat seed hairs right to the centre. Very light, there being almost no earthy matter.

52.79. Oat Seed Concretion.Hunterian.*

Half of a similar calculus, of larger size and markedly faceted ; the centre a fruit stone. (*Hunterian Plate IV.*, figs. 7 and 8.)

52.80. Oat Seed Concretion.Hunterian.*

Half of a similar calculus, having several layers and a very dense shell of earthy matter, faceted and polished in parts, apparently having been one of several in the same subject. Much heavier than the preceding calculi. (*Hunterian Plate III.*, figs. 3 and 4.)

52.81. Oat Seed and Mixed Phosphate Concretion.Hunterian.*

Half of a somewhat similar calculus. It is of roughly cubical shape, measuring 4 cm. on the side. Its exterior is of dark brown colour, faceted and polished, and consists of very dense hard phosphatic matter. The cut surface is of a brown colour, marked with concentric lines, due to its being formed in fine laminae varying in breadth and in hardness—soft where the vegetable hairs, and very hard where the earthy matter predominates. The earthy matter is a mixture of phosphates of calcium and magnesium, the former predominating. The centre is a large fruit stone. (*Hunterian Plate III.*, figs. 7 and 8.)

52.82. Oat Seed and Mixed Phosphate Concretion.*Hunterian.*

Halves of a similar concretion of oval shape and rough on the outside.

52.83. Oat Seed and Mixed Phosphate Concretion.Hunterian.*

The halves of a similar concretion of small size and irregular shape, with several polished facets on its exterior. (*Hunterian Plate III.*, figs. 5 and 6.)

52.84. Oat Seed and Mixed Phosphate Concretion.*Hunterian.*

The halves of a similar calculus. (*Hunterian Plate III.*, figs. 10 and 11.)

52.85. Oat Seed Concretion.Hunterian.*

A very large concretion of the same class, composed of vegetable hairs like those of the oat seed, nearly pure for the largest part of the concretion, but towards the outside mixed with phosphatic matter. It is of irregularly rounded short oval shape, measuring about 12 by 9 cm.—about as big as the foetal head at term. (*Hunterian Plate IV.*, figs. 1 and 2.)

52.86. Concretion of Vegetable Fibres and Triple Phosphates.*Hunterian.*

Half of a very large calculus, 15 cm. (6 inches) in diameter, 47 cm. (18½ inches) in circumference. "From a Horse" The whole calculus has apparently been of spherical shape. It is of light brown colour; its exterior nodulated; it has the velvety feeling of the oat seed concretions; in the cut surface it shows numerous layers of soft chalky mineral matter. It consists of the setae of the oat seed principally, with other vegetable matters. The mineral constituents are principally triple phosphates of magnesium and ammonium, but it is readily fusible, showing that there is a considerable admixture of phosphate of calcium. The centre seems to be pure felted vegetable fibre without any solid organic or inorganic nucleus.

52.87. Concretion of Vegetable Fibres and Mixed Phosphates.*Hunterian.*

A similar calculus, uncut. Not quite so large as the preceding. Darker brown in colour. Contains a large proportion of inorganic matter which, as in the preceding, is principally triple phosphate.

52.88. Concretion of Vegetable Fibres and Mixed Phosphates.*Hunterian.*

A similar calculus, but considerably smaller; nearly black in colour externally; in section seen to consist principally of inorganic matter, for the most part triple phosphates.

52.89. Concretion of Vegetable Fibres and Mixed Phosphates.*Hunterian.*

Half of a small calculus consisting of soft mixed phosphates, mostly triple, but fairly easily fusible, with a small proportion of of vegetable fibre. Looks like a ball of dried mud. It is nodulated externally like the preceding calculi.

DIVISION III.

Bezoar Stones.

In the collection were found nineteen calculi, or boxes of portions of calculi, which in their general appearance, characters, and

chemical reactions corresponded to the description of Bezoars given in the *Catalogue of the Calculi* in the Museum of the Royal College of Surgeons of England, where a far better and fuller account of them is given than could be found in numerous books of physiology and physiological chemistry which were examined. Of these nineteen calculi, eleven belonged to the class of calculi composed chiefly of Ellagic Acid—the so-called Oriental Bezoar; the remaining eight are Resino-bezoardic Acid Calculi—the Occidental Bezoar.

(A) CALCULI CONSISTING OF ELLAGIC ACID—THE ORIENTAL
BEZOAR.

There are in the collection eleven boxes of calculi or portions of calculi, which conform in their physical and chemical characters to the description and figures of the ellagic acid calculi in the Royal College of Surgeons' Catalogue, on which the following account of them is based (*Loc. cit.*, p. 227): "When an infusion of gall-nuts is exposed to the air for some weeks, and the vegetable mould which forms on its surface is removed from time to time, a crystalline powder is gradually deposited, which consists for the most part of impure gallic acid; if this deposit be digested in boiling water its gallic acid is dissolved, and there remains behind a dirty buff-coloured powder. This insoluble residue contains gallate of lime, ulmic acid and some other matters, but consists chiefly of the substance to which Braconnot has given the fanciful name of ellagic acid, derived from the word 'galle' reversed."

The Ellagic acid calculi are mostly of an ovoid figure, varying according to the shape of the nucleus. They are of a deep olive or greenish-brown colour, smooth and polished externally. In cut or broken surface they are of the same colour as externally. They are built up of fine concentric laminae, which show a considerable tendency to split apart from one another; and they invariably have a nucleus consisting of a piece of twig, a seed, or a stone.

They consist almost entirely of the ellagic acid of Braconnot, and a little woody fibre. Their chemical characters agreed with those given in the College of Surgeons' Catalogue as follows: "When heated they do not fuse, but emit a slight balsamic odour and partially sublime; if more highly heated they catch fire, burn with a low flame, and leave behind a carbonaceous ash. If the powder of the calculus be heated in a glass tube, a yellow sublimate is

produced, which condenses in the form of long spear-shaped crystals of a yellow colour with a shade of green. These crystals do not differ in their chemical habitudes from the powder of the calculus, and they are identical in shape and appearance with those procured from the ellagic acid of the gall-nut when similarly treated." They "easily dissolve, with the exception of a few flocks, in a cold solution of caustic potash or soda. The solution is of a deep brownish-red colour with a shade of green," the green appearing most when it is viewed in a thin layer. Hydrochloric acid throws down from the potash solution a "greenish buff-coloured powder, while the supernatant fluid is of a light red colour." For other tests, *vide loc. cit.* They are found in the stomachs of wild goats of Persia and other parts of Central Asia, and also in the stomachs of apes. They originate from the juices of the plants on which the animals feed, by agglutination round about some indigestible foreign body. All manner of medicinal virtues were formerly attributed to them.

52.90. Ellagic Acid Concretion. Oriental Bezoar.

Hunterian.

An oriental bezoar of the size and shape of an olive, uncut. It is of dark greenish-brown colour and beautifully polished. It is very heavy for its size (of high specific gravity), and sinks like a stone in water.

52.91. Oriental Bezoar.

Hunterian.

Portions of a similar concretion, broken to show the internal structure. The nucleus is absent.

52.92. Oriental Bezoar.

Hunterian.

Portions of a similar concretion showing the nucleus—a flat thin shelled nut rather larger than a cherry stone.

52.93. Oriental Bezoar.

Hunterian.

Of oblong shape, 3 by 1 cm., broken, showing the nucleus—a fragment of wood measuring about 2 by 5 cm.—the elongated shape of the calculus corresponding to that of its nucleus.

52.94. Oriental Bezoar.*Hunterian.*

Part of a similar concretion, the nucleus a piece of grass.

52.95. Portions of Oriental Bezoars.*Hunterian.*

A small box containing fragments of these concretions and several seeds which formed their nuclei.

52.96. Oriental Bezoar.*Hunterian.*

Half of an irregularly shaped concretion, cut, showing the nucleus—a relatively large mass of earthy matter.

52.97. Oriental Bezoar.*Hunterian.*

Portion of a much larger bezoar sawn longitudinally. It is of oblong shape, with cleanly rounded ends, measures 4 by 2 cm., is dark greenish-brown in colour and polished externally, of similar colour internally. Part of the nucleus is preserved; it appears to have been a very thin piece of grass or wood fibre.

52.98. Oriental Bezoar.*Hunterian.*

A smaller concretion, 3.2 by 1.3 cm., sawn longitudinally. It is of olive green colour.

52.99. Oriental Bezoar.*Hunterian.*

Half of a concretion, large for this class, measuring 4 by 2.6 cm., of light olive green colour and beautifully polished externally. The cut surface, which has been varnished to preserve it, shows a very fine concentric lamination. The nucleus, which has for the most part been removed, appears to have consisted of a considerable mass of vegetable fibre, measuring 2.2 by 1 cm. The calculus is even harder and heavier than the preceding calculi, yet on testing by the flame it consists almost entirely of combustible organic matter, and leaves only very minute mineral ash, consisting of earthy phosphates and carbonates.

52. 100. Oriental Bezoars.*Hunterian.*

Portions of a number of small concretions very similar to the preceding. They are even harder and heavier, yet contain only a very small proportion of inorganic matter.

(B) CONCRETIONS CONSISTING OF RESINO-BEZOARDIC ACID—
THE OCCIDENTAL BEZOAR.

There are eight calculi in the collection, which conform in their physical and chemical characters to the figures and description of resino-bezoardic (or lithofellic) acid calculi in the Royal College of Surgeons' Catalogue, p. 234 *et seq.* "Resino-bezoardic acid calculi are usually of an oval figure. Their external surface is smooth and polished, and has generally a greenish-yellow, green, or a light brown colour. They are made up of thin concentric layers, which are frequently of a deeper tint than the exterior. In the centre of the calculus some foreign body is invariably found which forms the nucleus. These calculi are exceedingly brittle; the fracture is conchoidal, and has a resinous lustre. They vary considerably, but are usually larger than the ellagic acid species." The largest in the collection measures 9 inches (23 cm.) in circumference. They are also less hard and of much lower specific gravity than the ellagic acid calculi. "They melt like resin in the flame of a candle, and, when more highly heated, give off white vapours which have an aromatic odour, catch fire, burn with a brilliant flame, and leave behind a small shining carbonaceous ash." Before the blow-pipe they melt and burn away, leaving ultimately a very minute ash of fusible phosphates. They readily dissolve in alcohol, with the exception of a few flocculent particles. The solution deposits minute crystals, which under the microscope are low six-sided prisms. On the addition of water to the alcoholic solution a resinous precipitate is thrown down. They also dissolve in the caustic alkalies and mineral acids. For further particulars, *vide loc. cit.* They are undoubtedly intestinal calculi. Their principal constituent—resino-bezoardic acid—appears to be a vegetable resin derived from the resinous juices of the food of the animals in which they are found. They are said also to show traces of biliary matter—a not uncommon constituent of any kind of intestinal concretion. (*Catalogue of Calculi*, R.C.S., Eng., p. 240.)

52.101. Resino-bezoardic Acid Calculus.*Hunterian.*

A large calculus, cut; of blunt oval shape, light greenish-brown colour, a good deal chipped, but polished where the old external surface remains. In section it is seen to be composed of very fine laminae, which vary in colour from a pale greenish-brown to a very dark brown. It has had a nucleus about the size and shape of a cherry stone, which is now absent. It is about as hard as sealing wax, very brittle; the laminae readily split asunder, and it melts and burns in very much the same manner as sealing wax, and with a somewhat similar odour. Sinks easily in water.

52.102. Resino-bezoardic Acid Calculus.*Hunterian.*

A similar concretion, somewhat smaller, cut across its long axis. It is of rather paler colour than the preceding. It has a minute nucleus—about the size of a caraway seed—of some hard, tough, apparently vegetable matter.

52.103. Resino-bezoardic Acid Calculus.*Hunterian.*

A much smaller calculus, of rounded cubical shape, divided, showing its nucleus—a small pebble. Around the nucleus the lamination is less distinct than in the outer parts, and there is a tendency to radiate crystalline formation.

52.104. Resino-bezoardic Acid Calculus.*Hunterian.*

A similar calculus, cut. There is no distinct nucleus, but the centre is composed of irregular masses of resin agglutinated together. Outside this it becomes finely laminated in the usual way.

52.105. Resino-bezoardic Acid Calculus.*Hunterian.*

Half of a similar concretion of oval shape, with a large nucleus consisting of a mass of loosely felted animal hairs and vegetable fibres. The layers of resinous matter next the nucleus show a tendency to radiate crystallization.

52.106. Resino-bezoardic Acid Calculus.*Hunterian.*

A small concretion very similar to No. 52.100, the nucleus wanting.

52.107. Resino-bezoardic Acid Calculus.*Hunterian.*

Half of a small concretion with a date stone for nucleus ; in shape a long oval like the stone.

52.108. Resino-bezoardic Acid Calculus.*Hunterian.*

Portions of a concretion of the same class, about the size and shape of an apricot stone. Nucleus absent.

DIVISION IV.

Calculi consisting of Phosphate of Magnesium and Ammonium—Triple Phosphate Calculus.

This species of calculus is the ordinary intestinal concretion of horses. There are twenty-six specimens of it in the collection. The history of most of them is unknown ; those of which there is any were taken from the intestines of horses. They are usually found in the caecum or other parts of the large intestine. The largest in the collection (only one half present now) measures 22 inches (56 cm.) in circumference, and weighed before it was cut over 14 lbs. The colour varies from that of a grey freestone to that of limestone. They are formed in fine concentric laminae. They invariably have some foreign body as a nucleus, which determines more or less the form of the calculus. As they get larger they tend to take a rounded form. The outer crust sometimes has a distinctly crystalline structure.

Chemically they consist principally of triple phosphate, with almost invariably traces of the earthy phosphates of calcium and magnesium. Some of them also contain traces of earthy carbonates and sulphate of calcium. They also contain a large amount of animal matter ; also frequently vegetable fibres and grains of sand and other inorganic particles. Heated before the blowpipe, they swell up, become white and opaque, and finally fuse ; the fusion being very difficult if they are pure triple phosphate, less difficult as the proportion of earthy phosphates becomes greater. They dissolve in hydrochloric and acetic acid ; a crystalline deposit of triple phosphate is thrown down on neutralizing the solution with ammonia.

“With regard to the origin of triple phosphate calculi, most authors agree that they are formed from the phosphate of magnesia

contained in wheat, oats, hay, etc., and this opinion derives confirmation from the circumstance that they occur most frequently in millers' and brewers' horses which are fed on grains and bran, substances known to contain a much larger proportion of magnesian salts than other vegetable matters."

52.109. Triple Phosphate Concretion. Horse. *Hunterian.*

An intestinal concretion supposed to be from a horse, cut. It is of tetrahedral shape with rounded angles. It measures 11 cm. in its largest diameter. It is of the colour of dark gray free-stone. The outer surface and some of the laminae show traces of crystallization. It is of soft chalky consistence, fairly easily fusible before the blowpipe; it consists principally of the triple phosphate (of magnesium and ammonium), but contains also a considerable proportion of earthy phosphates. It also contains a large amount of organic matter, part of which is the hair of oat seed. Its nucleus is a small pebble.

52.110. Triple Phosphate Concretion. *Hunterian.*

A similar calculus, uncut.

52.111. Triple Phosphate Concretion. *Hunterian.*

A similar calculus of much smaller size, broken. It shows throughout a crystalline tendency, and the centre is distinctly composed of radiating crystals. The outer parts are finely laminated. Part of it has also split into thick shells, each consisting of several of the finer laminae. Compare Nos. 52.123 *et seq.*

52.112. Triple Phosphate Concretion. *Hunterian.*

A small concretion 7.5 cm. in diameter, of spherical shape, flattened on two sides. A thick shell has been split off one of the rounded sides.

52.113. Triple Phosphate Concretion. *Hunterian.*

A spherical concretion 9 cm. in diameter, cut and ground. It consists of triple phosphate with traces of earthy phosphates and carbonates. Nucleus a small pebble.

52.114. Triple Phosphate Concretion.*Hunterian.*

A similar concretion slightly larger, cut and ground. The cut face has a coat of varnish to preserve it; shows the concentric lamination very clearly.

52.115. Triple Phosphate Concretion.*Hunterian.*

Half of a somewhat larger rounded cubical calculus.

52.116. Triple Phosphate Concretion.Hunterian.*

A concretion of oval shape, cut. The oval shape is due to the nucleus consisting of two calculi about the size of peas agglutinated together. The small calculi are of the same composition as the large, viz., principally triple phosphate. Measures 10 by 8 cm. (*Hunterian Plate V.*, fig. 3.)

52.117. Triple Phosphate Concretion.Hunterian.*

A somewhat similar stone, cut, of oval shape, with a sharp constriction round the middle of its long dimension producing a shape which suggests that it has arisen by the fusion of two stones. The lamination of the cut surface shows it to be a single formation around a long thin nucleus (which is not present). (*Hunterian Plate VIII.*, figs. 3 and 4.)

52.118. Triple Phosphate Concretion.Hunterian.*

A concretion, cut, which appears to be composed of eight spherical concretions agglutinated together, but which the cut surface shows to be of single formation about a very minute round nucleus. The laminae at first are in the form of a square, then a bulging of them about the angles and indentation in the middle of the sides appears, and gradually becomes more and more pronounced till the final deeply lobulated shape is reached.

The following note in William Hunter's handwriting accompanies the sketch of the calculus. "This cluster of stones was found in the great gut of a dray stone-horse belonging to Mr. Melyn; which horse died in 1732. It weighed $12\frac{1}{2}$ oz. avoirdupois. I bought it at Dr. Letherland's sale." The lobulation of the concretion is undoubtedly due to its being formed in the great

intestine; the nodules in shape and size closely resemble the masses of horse dung which are formed in the saccules of the great intestine. It is softer and more fusible than most of the concretions of this species, containing a very large amount of organic matter and a considerable proportion of earthy phosphates mixed with the triple. (*Hunterian Plate V.*, figs. 1 and 2.)

***52.119. Triple Phosphate Concretion.**

Hunterian.

A very large concretion, cut, lobulated in the same manner as the preceding. It measures 20 inches in its greatest circumference and weighs about 8 lbs. It consists of triple phosphates (magnesium and ammonium), with some phosphate of lime and layers of the tuft of hairs at the extremity of the oat. It has eleven lobules, each about 3 inches across. The nucleus is a very small pebble. (*Hunterian Plate VII.*, fig. 3.)

52.120. Triple Phosphate Concretion. Horse.

Presented by Alex. S. Young, Esq., 1896.

A very large calculus, uncut, of irregular oval shape, measuring $21\frac{1}{2}$ inches (55 cm.) in its greatest circumference, and weighing $9\frac{1}{4}$ lbs. In colour it is like limestone, with deep brown patches of organic matter here and there which do not give the reactions of blood. It is composed of triple phosphates with traces of earthy phosphates; the outside layer is in the form of large opaque crystals of various shapes. The person who removed it did not notice what part of the abdomen it came from, and what symptoms it produced, if it produced any, is not known.

52.121. Triple Phosphate Concretion. Horse.

Presented by Hugh Vallance, M.D., Strathaven.

Half of a very large concretion of spherical shape. It measures 22 inches (56 cm.) in circumference, and weighs $6\frac{3}{4}$ lbs. It is light for its size compared with other stones of the same class, because the centre for a diameter of 6 inches is a ball of soft loose organic matter infiltrated with phosphates, much of which has fallen out, and what remains is comparatively light. It is the largest concretion in the museum. A note by Professor Thomas Thomson states that it was from the intestine of a horse,

and weighed when whole above 14 lbs. It consisted of triple phosphates (magnesium and ammonium), with some phosphate of lime and layers "of the tuft of hairs at the extremity of the oat. A very small quantity of sulphate of lime is also scattered through the concretion."

52.122. Triple Phosphate Concretion.

Hunterian.

A similar concretion, uncut, of flattened spherical shape, nearly as large as the preceding. A number of the outer laminae are imperfect.

52.123. Triple Phosphate Concretion.

Hunterian.

Fragments of a small tetrahedral calculus of the same class as the preceding, broken, and the thicker laminae separated. Each of the separated laminae can be seen to consist of a large number of very fine laminae. Nucleus absent.

***52.124. Triple Phosphate Concretion.**

Hunterian.

A small concretion (only $2\frac{3}{4}$ by 2 by $2\frac{1}{2}$ inches) of flattened oval shape, cut, ground and varnished. (*Hunterian Plate VI., fig. 2.*)

52.125. Triple Phosphate Concretion.

Hunterian.

A similar calculus, half cut through, then broken. These small calculi are mostly of a pale limestone colour. In composition they are like the large ones.

52.126. Triple Phosphate Concretion.

Hunterian.

Another of the same, cut, with a small pebble for a nucleus.

***52.127. Triple Phosphate Concretion.**

Hunterian.

A small concretion cut and varnished. Harder than stones of this class usually are; mostly triple phosphates. Nucleus a small pebble. (*Hunterian Plate VI., fig. 5.*)

52.128. Triple Phosphate Concretion.

Hunterian.

A small spherical concretion, cut.

52. 129. Triple Phosphate Concretion. *Hunterian.*

Half of a small oval concretion.

52. 130. Triple Phosphate Concretion. *Hunterian.*

Half of a small tetrahedral concretion of triple phosphates round a small flint pebble.

52. 131. Triple Phosphate Concretion. *Hunterian.*

Half of a small oval concretion with a small nail for nucleus.

52. 132. Triple Phosphate Concretion. *Hunterian.*

Half of a small tetrahedral concretion with a small piece of flint for nucleus.

52. 133. Triple Phosphate Concretion. *Hunterian.*

A similar but smaller concretion, cut. Nucleus a pebble.

52. 134. Triple Phosphate Concretion. *Hunterian.*

A similar but smaller concretion, cut.

52. 135. Triple Phosphate Concretions. *Hunterian.*

Three small flat oval concretions, uncut.

DIVISION V.

Concretions consisting of Phosphate of Magnesium.

Specimens wanted.

DIVISION VI.

Concretions consisting of Phosphate of Calcium.

There are fifteen concretions in the museum belonging to this species. The history is known of none of them, but there is

no doubt that they are intestinal, and from the lower animals. Most of them have a foreign body for nucleus. In figure they are oval or of various irregular shapes due to there being several nuclei, or one nucleus of irregular shape. "Their exterior is of a light brown colour, smooth, and sometimes polished; when divided they present a regular laminated structure, the layers usually adhering so slightly to each other that they are readily separated into concentric crusts, which vary in thickness from a twentieth to a quarter of an inch. Each concentric layer is composed of an assemblage of fine crystalline needles, which radiate from the centre to the circumference of the calculus, so as to give it when broken a beautifully striated appearance. This species never attains so large a size as the triple phosphate calculus." (*Catalogue of Calculi*, R.C.S., Eng., p. 251.) The largest specimen in the collection measures 7 by 6·3 cm. ($2\frac{3}{4}$ by $2\frac{1}{2}$ inches). The diphosphate of lime calculi are mostly exceedingly hard; they fuse with difficulty before the blowpipe; if phosphate of magnesia be present, they fuse more readily. They dissolve in hydrochloric or acetic acid, and the solution gives an amorphous deposit on neutralizing with ammonia.

***52.136. Phosphate of Calcium Concretion.** *Hunterian.*

A beautiful oval concretion divided longitudinally. Its exterior is of light brown colour, smooth and polished. In section it is seen to be made up of a number of concentric shells, like the rings of a tree, which are readily separable; this has been done with the one portion. Each of the shells is beautifully smooth inside and out like the exterior of the concretion; each is composed of a large number of very fine lamellae, which show no tendency to split apart. The grain of the stone being very close, the crystalline structure is not so apparent as in some of the others, especially those which have been broken instead of cut. The nucleus is an oval mass of bone about the size of a plum stone. The calculus measures 6·2 by 4·8 cm. (*Hunterian Plate VIII.*, fig. 6.)

***52.137. Phosphate of Calcium Concretion.** *Hunterian.*

A similar concretion divided transversely. The nucleus is a piece of twig. (*Hunterian Plate VII.*, fig. 3.)

***52.138. Phosphate of Calcium Concretion.** *Hunterian.*

A similar calculus divided, the largest of this class in the collection. It is of blunt oval shape; the outer laminae over the ends are very thin, giving it a truncated appearance. It measures 7 by 6.3 cm. It is beautifully laminated in light yellow and various shades of brown; some of the laminae distinctly crystalline. The nucleus has been a very thin straight body about 2.5 cm. long. (*Hunterian Plate VIII., fig. 2.*)

52.139. Phosphate of Calcium Concretion. *Hunterian.*

Half of a concretion rather smaller than the preceding, of blunt oval shape, with a constriction about the middle of its length. It is cut, and the different laminae composing it separated as in No. 52.136. Its peculiar shape is seen to be due to its having two centres of formation which seem to have become united at an early period by a layer of soft mineral matter mixed with organic matter. The two centres have gone on growing by additions of the usual hard phosphate of calcium to their free surfaces till they attained considerable size, but the opposing surfaces of the new-forming laminae have remained separated by a layer of organic debris. After a time this organic layer has got left out, and the laminae of calcium phosphate have become continuous round both, as round a single centre, with a constriction opposite the line of union. The other portion of the stone "was given to Dr. Knox, 18/4/70."

52.140. Phosphate of Calcium Concretion. *Hunterian.*

Halves of two concretions similar to those composing the centres of the preceding. They are of roughly hemispherical shape, the flat sides which fit accurately to one another having, as in the preceding, traces of a coating of organic matter. The centres are at the flat sides of the concretions, and the laminae which constitute their bulk are formed round the convex ends in semicircles which end abruptly at the flat ends. The calculi were found separate, but fit perfectly to one another. The mode of formation is explained by the previous specimen.

52.141. Phosphate of Calcium Concretion. *Hunterian.*

The other halves of the preceding, the laminae to some extent separated.

52.142. Phosphate of Calcium Concretion. *Hunterian.*

A similar concretion, cut, and the laminae separated to show its structure.

52.143. Phosphate of Calcium Concretion. *Hunterian.*

A small concretion similar to the preceding, broken, showing the crystalline structure very nicely. The crystals in some of the laminae are from 5 to 7 mm. long. They radiate from the nucleus, which is a small piece of twig.

52.144. Phosphate of Calcium Concretion. *Hunterian.*

A small heart-shaped concretion, cut, and the laminae separated.

52.145. Phosphate of Calcium Concretion. *Hunterian.*

A similar calculus of irregular heart shape, cut. An extremely hard stone.

52.146. Phosphate of Calcium Concretion. *Hunterian.*

An irregular mass of calcium phosphate concretion formed in the typical way about several centres, divided. The texture of the stone is unusually open, and shows the crystalline structure very clearly.

52.147. Phosphate of Calcium Concretion. *Hunterian.*

A concretion about the size and shape of a hazel nut, divided, showing the nucleus a small dark stone.

52.148. Phosphate of Calcium Concretion. *Hunterian.*

Two small dark brown concretions, one broken showing its crystalline structure. The dark colour is only on the exterior, and is due to a coating of organic matter.

52.149. Phosphate of Calcium Concretion. *Hunterian.*

An irregular concretion of the same class. In shape and colour it suggests a small unwashed kidney potato, a resemblance decidedly heightened by the end of the twig which forms its nucleus projecting from one end.

DIVISION VII.

Concretions consisting principally of Oxalate of Lime.

There is only one calculus of the above composition belonging to this series in the museum. It is a large calculus which has been of nearly globular or short oval shape, measuring in its longest diameter 11·4 cm., in its shortest 9 cm.; it was broken into numerous fragments which were easily identified as belonging to one another by their very peculiar appearance, and the accuracy with which they could be fitted together. About one-half of the concretion has been glued together and forms Specimen No. 52.150; the remaining fragments left loose form No. 52.151. The intestinal nature of it is clearly shown by its having a large mass of vegetable fibres mixed with softer organic debris and earth for its centre. Its source is not known. Like most concretions it is formed in fine laminae which are with difficulty separable. It has split into a central shell about 1·2 cm. thick surrounding the nucleus, and an outer shell fully 2·5 cm. thick; both of these show some tendency to split into thinner shells. There is no distinct radiate arrangement of crystals as in the phosphate of lime calculi. It is not tuberculated like the urinary oxalate calculi, and is much less hard. It is brown in colour, and in appearance and texture is exactly like sandstone. The inner shell is of lighter brown colour, harder and finer in the grain than the outer. The outer is like rather coarse-grained sandstone, and fairly soft and crushable. Its exterior is rough like a coarse water-worn sandstone. Before the blowpipe both parts swell up to a loose white ash which effervesces strongly with acids. The powder of both appears to be insoluble, or only to a very slight extent soluble in acetic acid. With hydrochloric acid the powder of the outer layer at first effervesces and partly dissolves; the residue, a considerable one, dissolves slowly and without effervescence; that of the inner shell does not effervesce, but slowly dissolves. The inner shell consists of almost pure oxalate of lime; the outer of oxalate of lime mixed with a large proportion of carbonate of lime. The proportion of organic matter is small.

52.150. Intestinal Concretion composed principally of Oxalate of Lime. *Hunterian.*

About one-half of the concretion described above, the fragments fitted together and united with glue.

52.151. Intestinal Concretion composed principally of Oxalate of Lime. *Hunterian.*

A number of fragments of the same concretion as the preceding, lying loose in a box. A considerable amount of the concretion is amissing.

DIVISION VIII.

Concretions from the Vermiform Appendix.

Specimens wanted.

SECTION V.

FOREIGN BODIES FROM THE ALIMENTARY TRACT.

52.152. "Large Metal Type from the Stomach of the Rhinoceros." *Hunterian.*

52.153. Foreign Bodies from the Stomach of the Ostrich.

"Pieces of a silver buckle, etc., taken out of the stomach of an ostrich, which died of a long piece of wood, about three inches, which could not pass into the duodenum, but worked itself through the stomach." See also Nos. 34.1 to 34.4.

SERIES 53.

URINARY CALCULI.

This series includes all calculi from the various parts of the genito-urinary system in which such bodies are found; it includes, therefore, prostatic calculi. There are in the series 178 specimens—all but three of which are urinary calculi. As to the history of the specimens, classification, etc., *vide* introduction to Calculi in General at the beginning of Series 52. In this series there are, in addition to the Hunterian calculi, a few taken from a small collection of unknown history presented to the museum by Professor P. A. Simpson. A few of these were valuable from having short notes of their history attached, and were therefore added to the series.

<i>Calculi of Uric Acid,</i>	1-28
<i>Calculi of Uric Acid and Some Calcium Oxalate,</i>	29-55
<i>Calculi of Uric Acid and Some Phosphates,</i>	56-65
<i>Calculi of Uric Acid and Some Ammonium Urate,</i>	66-76
<i>Calculi of Ammonium Urate,</i>	77-90
<i>Calculi of Calcium Oxalate,</i>	91-98
<i>Calculi of Calcium Oxalate and Some Uric Acid or Urates,</i>	99-121
<i>Calculi of Calcium Oxalate and Some Phosphates,</i>	122-135
<i>Calculi of Mixed Phosphates,</i>	136-161
<i>Calculi of Mixed Phosphates, with a Foreign Body for Nucleus,</i>	162-164
<i>Calculi of Triple Phosphate,</i>	165-169
<i>Calculi of Calcium Carbonate,</i>	170-175
<i>Calculi of Cystin, Xanthin, etc.,</i>	—
<i>Prostatic Calculi,</i>	—
<i>Models of Calculi, etc.,</i>	176-178

SECTION I.

CALCULI CONSISTING PRINCIPALLY OF URIC ACID.

Uric acid, either pure or in the form of urates, enters into the composition of a very large proportion of urinary calculi. It constitutes the principal part of 76 out of the 175 specimens in the collection, which are accordingly classified as uric acid calculi. It is also the principal ingredient of other fourteen which have been classified as ammonium urate calculi; it certainly appears, either in the form of uric acid or urate of ammonium, in 52 others, and probably is present in a considerable number of those which from being uncut cannot be properly examined. The uric acid calculi vary very much in size, from the small particles called uric acid gravel upwards, the largest in the collection being larger than an emu's egg, and weighing $1\frac{3}{4}$ pounds.

When they are of any size they are usually of oval shape; they are pale grayish-yellow, yellowish-brown, or reddish-brown in colour; smooth or slightly rough externally, and as a rule very hard. The uric acid is deposited in two different formations: (1) in fine dense concentric laminae, (2) in crystalline granules more or less closely agglutinated together; many calculi show both forms. Before the blowpipe the uric acid calculus burns away, leaving no residue if composed of pure uric acid, if impure a small mineral ash due to the presence of urates or phosphates of the alkaline earths or calcium oxalate. Heated with nitric acid it melts with effervescence, and on cautiously drying leaves a beautiful pink or red deposit, which turns purple on addition of ammonia—the murexide reaction. For the tests for the other ingredients, see under ammonium urate calculi, etc. No attempt was made to estimate the amount of the urates or other matters mixed with the uric acid.

*(a) Calculi consisting of Uric Acid Practically Pure.***53.1. Uric Acid Calculus.***Hunterian.*

An oval calculus of fairly large size (5.6 by 4.7 cm.), rather greater than a hen's egg, composed of practically pure uric acid; divided. It is of light brown colour throughout. The central part is formed in coarse granules, the outer parts in dense fine laminae. Its exterior is rough. Before the blowpipe the outer parts burn up entirely; the inner leaves only an extremely minute mineral ash.

53.2. Uric Acid Calculus.*Hunterian.*

A calculus about the same size as the preceding, cut. Both halves have also been broken across, and one portion lost. It has the following history: "A man cut by Mr. Lambert, Apr. 10, 1778. He had been cut by do., Feb. 1, 1777, and a few days after passed a small stone from the kidney and wound. A few days after his cure passed a stone from his kidney into his bladder, but never voided it. This no doubt was the very stone, viz., of about 12 months' growth; quite dry; weight, 391 grains. 70 cut; 9 died."

53.3. Uric Acid Calculus.*Hunterian.*

Half of an oval calculus nearly as big as a goose's egg. Pure uric acid, granulated in centre.

53.4. Uric Acid Calculus.*Hunterian.*

Portions of a calculus of blunt oval shape, which must have been even larger than the preceding. The centre granular, the rest compact and laminated.

53.5. Uric Acid Calculus.*Hunterian.*

The two halves of a calculus about the size of a duck's egg, of long oval shape, composed entirely of finely laminated uric acid. Externally smooth.

53.6. Uric Acid Calculus.*Hunterian.*

A calculus, cut, rather smaller than the preceding, composed of pale brown uric acid in very fine dense laminae. It has split radially into several fragments, some of which show a tendency to further radial splitting.

53.7. Uric Acid Calculus.*Hunterian.*

Half of a concretion about the size of a duck's egg, of oval shape, with broad ends. It is very hard and heavy. The centre and a broad outer layer are formed of fine laminae of various shades of brown; the stratum between is granulated, but very compact. Its exterior is finely tuberculated, like an oxalate of lime calculus, but it is composed throughout of practically pure uric acid.

53.8. Uric Acid Calculus.*Hunterian.*

A very large concretion of oval shape, flattened (as is usually the case) in one direction, broken into fragments. About one half has been pieced together again. Measured 10 by 7 by 4.3 cm., and consists of pure uric acid, in fine laminae and very dense. Its exterior is finely tuberculated. There are one or two dark patches on the exterior which consist of oxalate of lime.

53.9. Uric Acid Calculus.*Hunterian.*

A calculus rather smaller than a hen's egg, of a pale buff colour. Pure uric acid throughout.

53.10. Uric Acid Calculus.*Hunterian.*

A similar calculus, uncut, but broken at one end. Very smooth externally and very hard.

53.11. Uric Acid Calculus.*Hunterian.*

Half of a calculus about the size of a hen's egg, of fair oval shape, cut. It is formed in fine laminae of various shades of brown; very dense and hard.

53.12. Uric Acid Calculus.*Hunterian.*

A flattened oval calculus about the size of a pigeon's egg. Finely tuberculated externally. Of rich ruddy brown colour.

53.13. Uric Acid Calculus.*Hunterian.*

A pale brown calculus similar in shape to the preceding, but slightly larger, cut.

53.14. Uric Acid Calculus.*Hunterian.*

A flat concretion of roughly triangular outline, composed of pale cinnamon-brown uric acid, for the most part deposited in granular form. Very soft for a uric acid stone. About the same size as the preceding, cut.

53.15. Uric Acid Calculus.*Hunterian.*

A stone of kidney shape, about the size of a damson, cut transversely.

53.16. Uric Acid Calculus.*Hunterian.*

A stone about the size and shape of a kidney bean, cut.

53.17. Uric Acid Calculus.*Hunterian.*

A stone of roughly spherical shape, flattened on two sides as if it had not been the only stone in the bladder. Of very pale brown colour, but apparently pure uric acid throughout. Compare next specimen.

53.18. Uric Acid Calculi and Gravel.*Hunterian.*

A boxful of small uric acid calculi of various sizes. They are all faceted; whether from one case or not is unknown. There are two largish stones similar in shape and characters to the preceding specimen; probably, from the manner in which they fit together, from the same case as it. There is a third not much smaller, and the rest are of various sizes down to very minute grains. Many of them are broken. Pure uric acid.

53.19. Uric Acid Calculi.*Hunterian.*

A boxful of small clay-coloured calculi of various irregular shapes; they are all tuberculated in the same manner, and were probably from one case. They vary in size from a hemp seed to a cherry stone. They are hard and brittle, and consist of pure uric acid.

53.20. Uric Acid Gravel.*Hunterian.*

A boxful of small calculi, from minute grains to the size of hemp seed. Pure uric acid. Of pale clay colour now. Very hard.

53.21. Uric Acid Gravel.*Hunterian.*

A boxful of calculi and fragments of calculi, from a minute grain up to the size of small peas. They are very friable and loose-

textured, and brittle; most of them are broken. Pure uric acid of pale brown colour.

53.22. Uric Acid Calculi.

Dr. D. Mackenzie of Kilcreggan, 1867.

Four small stones passed by a patient of Dr. Mackenzie. Three of them are of oval shape, less than 1 cm. long, of dark brown colour and smooth. The fourth, slightly larger, is partly covered by dark organic matter (blood), which causes to adhere to it a number of minute calculi giving it a tuberculated appearance. They are all composed of pure uric acid.

53.23. Uric Acid Calculus.

Hunterian.

A small oval concretion about the size of a cherry stone, roughly tuberculated externally. Uric acid with a good deal of organic matter entangled with the tubercles.

53.24. Uric Acid Calculus.

A calculus similar to but considerably smaller than the preceding; it was taken from a box of calculi of which the history is unknown. Not Hunterian. Attached was the history, "From urethra of a boy by incision."

53.25. Uric Acid Calculus.

Similar to the preceding, from the same collection. "By incision"—presumably from the urethra.

53.26. Uric Acid Calculus. Renal (?).

Hunterian.

A calculus, uncut, of considerable size and irregular elongated form, measuring 8 cm. in length by from 1.5 to 2 cm. in thickness. It is fairly smooth, but has several rounded projections. It is of deep reddish-brown colour, very hard and its exterior is pure uric acid. To judge by its shape it is a kidney stone. Compare Nos. 41.10 to 41.26.

53.27. Uric Acid Calculus. Renal.*Hunterian.*

A stone about the size and somewhat the shape of a kidney bean. "From Mr. Hume's right kidney." Compare No. 41.49. He is said to have died of "gout in the stomach."

53.28. Uric Acid Calculus.*Hunterian.*

A boxful of fragments, of various shapes and sizes, of uric acid calculi. They are of pale buff colour, and have rounded edges as if they had been partly dissolved at some time.

(b) Calculi consisting principally of Uric Acid, but showing distinct Traces of Calcium Oxalate either in the form of a Nucleus or mixed with the Uric Acid.

They are practically uric acid calculi. There are 30 stones of this species in the collection.

53.29. Uric Acid Calculus.*Hunterian.*

An oval stone about the size of a hen's egg, consisting of uric acid with a distinct trace of calcium oxalate throughout. Its substance is partly granulated, partly dense and in fine laminae, of various shades of brown. Its exterior has a rough water-worn appearance as if it had been undergoing solution.

53.30. Uric Acid Calculus.*Hunterian.*

A somewhat larger stone, presenting characters almost identical with the preceding. There is a trace of oxalates throughout, and the nucleus contains urate of ammonium.

53.31. Uric Acid Calculus.Hunterian.*

An oval stone rather smaller than the preceding, cut across its long axis. The nucleus is a small flattened stone of compact laminated uric acid placed eccentrically. The bulk of the stone has been added around one side and the ends of the nucleus, the free side being hardly added to at all. Nearly all of the stone outside the nucleus is in the form of coarse granules adhering closely to one

another with small irregular spaces between. The side towards which the nucleus lies is smooth with indistinct traces of nodulation; the other is a mass of fine tubercles like the exterior of a calcium oxalate calculus. Nevertheless the stone is almost pure uric acid with only a small proportion of calcium oxalate. (*Hunterian Plate XVII., fig. 6.*)

53. 32. Uric Acid Calculus.

Hunterian.

Fragments of a calculus about the size of a hen's egg, broken. The nucleus is absent; the outer parts consist of granular material with a decided tendency to radiate arrangement of the crystallization. Uric acid with only a minute trace of calcium oxalate.

53. 33. Uric Acid Calculus.

Hunterian.

Half of a flattened oval stone rather smaller than the preceding, partly laminated, partly granular, and its exterior finely tuberculated. Uric acid with distinct traces of calcium oxalate throughout.

53. 34. Uric Acid Calculus.

Hunterian.

Part of a somewhat larger stone formed in alternating layers of dense laminated and loose granulated uric acid with a small admixture of calcium oxalate. Exterior roughly tuberculated.

53. 35. Uric Acid Calculus.

Hunterian.

A small flattened oval stone, composed of fine wavy laminae of very dense uric acid mixed with a considerable amount of calcium oxalate. Smooth externally.

53. 36. Uric Acid Calculus.

Hunterian.

Half of a flattened oval calculus about the size of a plover's egg, consisting of a centre of granulated material and three layers—dense laminae, granulated, and again dense laminated—the last having a smooth external surface. The granulated layers contain more calcium oxalate than the others; all show a very considerable trace of it.

53.37. Uric Acid Calculus.*Hunterian.*

Half of a calculus about the size of a duck's egg, composed, like the preceding, of a large centre of granular uric acid, surrounded by alternating layers of dense laminated and granular uric acid mixed with a considerable amount of calcium oxalate. Exterior tuberculated.

53.38. Uric Acid Calculus.*Hunterian.*

Half of a calculus about the same size as the preceding. The central parts are of rather soft uric acid with a tendency to the granular formation; the outer part consists of very fine wavy laminae. The central parts show a trace, and the outer a considerable amount, of calcium oxalate. Exterior tuberculated.

53.39. Uric Acid Calculus.Hunterian.*

A calculus considerably smaller than the preceding, of flattened oval shape, bulging considerably on one side, cut. The peculiar shape is due to its having two nuclei—a large one, a mass of granular uric acid about 3 by 1.5 cm., and a small one of the same structure applied to the middle of one of the long sides of the large one. They are separated by a layer of dense material, and the outer parts of the calculus are made up of a layer, about 1 cm. thick all round, of laminae of various degrees of compactness. It consists throughout of uric acid with a distinct trace of calcium oxalate. The exterior nearly smooth. (*Hunterian Plate XVIII.*, fig. 7.)

53.40. Uric Acid Calculus.*Hunterian.*

A calculus about the same size as the preceding. It has a centre of laminated dense uric acid, a granular layer which shows traces of oxalates, and, externally to that, a broad zone of very dense finely laminated uric acid, nearly pure. Rough excrescences like the points of a calcium oxalate stone project here and there, but they are, nevertheless, uric acid.

53.41. Uric Acid Calculus.Hunterian.*

This specimen appears to be a fragment of a large stone which has been left in the bladder, and has received a fine coating of calculous

material over its rough surfaces. It consists of uric acid mixed with a good deal of oxalates formed in very dense fine laminae. It is very hard. (*Hunterian Plate IX.*, figs. 5 and 6, its external surface before cutting and its cut surface both being figured.)

***53.42. Uric Acid Calculus.**

Hunterian.

A calculus as large as a hen's egg. It consists of a dense shell about 1 cm. thick, in which lie, quite loose, a number of coarse rough granules, in size from that of a hemp seed to that of a pea. The figure shows that originally it had a compact nucleus, in appearance like a calcium oxalate calculus, which is now absent. The loose granules consist of uric acid with a considerable amount of calcium oxalate and much organic matter. The shell is of uric acid with a trace of calcium oxalate. (*Hunterian Plate XVIII.*, fig. 9.)

53.43. Uric Acid Calculus.

Hunterian.

A large stone of pure uric acid with a small calcium oxalate calculus of irregular oval shape for its nucleus.

53.44. Uric Acid Calculus.

Hunterian.

A stone about the size of a hen's egg, composed of alternate layers of granular and laminated uric acid, with traces of calcium oxalate round a nucleus which consists of two small dense uric acid calculi.

***53.45. Uric Acid Calculus.**

Hunterian.

A somewhat smaller stone, consisting of a finely laminated dense centre, an intermediate granulated layer, and an outer dense shell of uric acid mixed with a good deal of calcium oxalate. (*Hunterian Plate XVII.*, fig. 2.)

53.46. Uric Acid Calculus.

Hunterian.

A calculus composed throughout of uric acid and a trace of calcium oxalate, formed in fine laminae, very compact and hard like the centre of the preceding.

53.47. Uric Acid Calculus.*Hunterian.*

A similar calculus about the size of a pigeon's egg. The nucleus is uric acid, pure, with a distinct narrow ring of dark coloured almost pure calcium oxalate round it; the rest mixed.

53.48. Uric Acid Calculus.*Hunterian.*

A stone rather larger than the preceding, consisting of pale, rather soft, uric acid round a small nucleus of uric acid mixed with a large proportion of calcium oxalate.

53.49. Uric Acid and Calcium Oxalate Calculus.*Hunterian.*

An oval very hard stone about the size of a plover's egg, cut across its long diameter. In its centre is a cavity in which the nucleus—a small dark brown calcium oxalate calculus—lies loose. The cavity is lined by a thin shell of dark calcium oxalate, outside which the greater part of the calculus consists of granulated calcium oxalate mixed with uric acid; the proportion of uric acid gradually increases towards the exterior, and the structure changes to the dense laminated formation; the outermost part is nearly pure uric acid. Exterior nearly smooth.

53.50. Uric Acid Calculus.*Hunterian.*

A large blunt oval stone of pale uric acid—partly granulated, partly dense and laminated—round a small calcium oxalate stone, which has a very small nucleus of urate of ammonium. The outer layers show a trace of urate of ammonium.

53.51. Uric Acid Calculus.*Hunterian.*

A stone about the size of a pigeon's egg, composed of uric acid with traces of calcium oxalate—in very fine laminae of beautifully varied shades of brown—round a small calcium oxalate calculus with urate of ammonium centre. A considerable part of one end of the stone has broken away—evidently while it was in the bladder, as there are traces of phosphates deposited on the broken surfaces.

53.52. Uric Acid Calculus.*Hunterian.*

Half of an oval calculus of uric acid, with a considerable amount of calcium oxalate intermixed, deposited—partly in granules, partly in fine laminae—round a nucleus of uric acid with some urate of ammonium in the very centre.

53.53. Uric Acid Calculi. Two in the Same Bladder.Hunterian.*

Two calculi consisting of uric acid with traces of oxalate of lime. The one—about the size of a hen's egg—is of the usual flattened oval shape; the other—rather smaller than a pigeon's egg—is of a sort of blunt boat shape, with one surface concave. This concave surface fitted on to one end of the large stone. They form the subject of figs. 1 and 2 of *Hunterian Plate XII.*, which show their relative positions—fig. 1 showing the outer surfaces, fig. 2 the cut surfaces. The external surfaces partly smooth, partly tuberculated.

53.54. Uric Acid Calculus.*Hunterian.*

A stone very like the small one in the preceding specimen, and which doubtless owed its shape to having been associated with another stone in similar manner. Its fellow could not be identified. Uric acid with trace of calcium oxalate.

53.55. Uric Acid Calculi. Two in One Bladder. *Hunterian.*

Two calculi, cut; probably from the same case. Mounted together in a small show case. The one is a flattened oval stone about the size of a pigeon's egg; the other is about the size of a goose's egg, in shape somewhat flattened, and in profile of the broadest surface oval, with a deep bay in either side, which corresponds in size with the small stone. Probably the small stone lay sometimes on the one side of the large, sometimes on the other. They are of the same composition—uric acid with a trace of calcium oxalate. The exterior of the large one is tuberculated. Not having been varnished, they are rather rotten and crumbling.

(c) Calculi consisting of Uric Acid and Phosphates.

The specimens included under this title are calculi which are primarily uric acid stones belonging to one or other of the preceding species, but showing a layer or layers of phosphates of the normal alkaline earths, viz., phosphates of calcium, magnesium, and of magnesium and ammonium (triple phosphate) mixed in varying proportions, constituting the fusible calculus. The phosphates as a rule form the external shell of the stone. In one or two they are mixed with the uric acid. In one there is a layer of uric acid outside the phosphates. In most the phosphates show a trace of urate of ammonium. The exterior is always rough. Compare Section IV., Phosphatic Calculi.

53.56. Uric Acid and Phosphate Calculus. *Hunterian.*

A calculus consisting of a uric acid stone about the size of a pigeon's egg, with a nucleus of oxalate of lime about the size of a pea, and outer shell of fusible mixed phosphates. The phosphates are of dirty white colour, and loose and friable.

53.57. Uric Acid and Phosphate Calculus. *Hunterian.*

A smaller calculus similar to the preceding. The exterior is unusually smooth. There is a good deal of phosphates mixed through the uric acid stone. The nucleus is a small urate of ammonium calculus.

53.58. Very Large Uric Acid and Phosphate Calculus.*Hunterian.*

An enormous calculus "from a man"; doubtless removed post-mortem. It is of irregularly oval shape, and measures 14 by 8.3 by 7.5 cm. ($5\frac{1}{2}$ by $3\frac{1}{4}$ by 3 inches)—considerably larger than an emu's egg. Its exterior is of fusible phosphates, which appear to constitute only a thin shell; at one side this is imperfect, and there appears a uric acid calculus which probably constitutes the main mass. It has been broken and pieced together again with plaster of Paris. Some of the phosphatic shell has a distinctly crystalline appearance, like the exterior of the triple phosphate intestinal concretions, and it

consists largely of triple phosphates, but mixed with a certain amount of the earthy phosphates. Its weight was "1 lb. 12 $\frac{3}{4}$ oz. avoirdupois."

53.59. Uric Acid and Phosphate Calculus.

Hunterian.

An irregularly oval stone about the size of a hen's egg, consisting of a uric acid and oxalate of lime (mixed) stone surrounded by a shell, from .5 to 1 cm. thick, of mixed phosphates.

53.60. Uric Acid and Phosphate Calculus.

Hunterian.

A small stone of flattened spherical shape, consisting of uric acid with a thin shell of unusually dense mixed phosphates. Between the uric acid and the phosphates is a distinct line, of paler brown colour, which is largely urate of ammonium.

53.61. Uric Acid and Phosphate Calculus.

Hunterian.

A large uric acid stone with a calcium oxalate stone about the size of a hazel nut for nucleus and a thin external shell of mixed phosphates.

53.62. Uric Acid and Phosphate Calculus.

Hunterian.

Half of a similar but smaller stone, the nucleus uric acid and the layer of phosphates very thin. Also a good deal of calcium oxalate in a layer in which the uric acid is of the granular form.

***53.63. Uric Acid and Phosphate Calculus.**

Hunterian.

A stone about the size of a pigeon's egg. The cut surface shows a small flattened oval calculus, of uric acid mixed with a good deal of calcium oxalate, placed at one side, then a wide crescentic mass of fusible phosphates building it up to a circular outline, and then a narrow ring of uric acid and oxalate forming a complete shell round the other two parts; and outside that, over about half of the stone, on the same side as the enclosed mass of phosphates, another layer of mixed phosphates of crescentic shape in section. (*Hunterian Plate XVIII., fig. 6.*)

***53.64. Uric Acid and Phosphate Calculus.** *Hunterian.*

Half of an oval stone about the size of a pigeon's egg. It has a small rounded nucleus of pale pinkish-white colour, very hard, consisting of uric acid and urate of ammonium. This is surrounded by a thin shell of dark brown calcium oxalate, outside of which the stone consists of pale soft uric acid with traces of oxalate and in the outermost layers a large amount of fusible mixed phosphates. (*Hunterian Plate XVII., fig. 4.*)

53.65. Uric Acid, Phosphate, and Calcium Carbonate Calculus. *Hunterian.*

A stone very similar in appearance to the preceding set of specimens, consisting of a uric acid calculus about the size of a pigeon's egg enclosed in a thin white shell like the mixed phosphates but denser and of more chalky appearance; also smoother externally. This layer fuses without much difficulty before the blowpipe as if composed of mixed phosphates, but with cold hydrochloric acid it effervesces freely; apparently consists of phosphates mixed with some calcium carbonate.

(d) Calculi consisting principally of Uric Acid, and containing some Urate of Ammonium.

The presence of urate of ammonium was determined by the evolution of ammonia on addition of caustic potash. No attempt was made to estimate the relative proportions of uric acid and urates in these calculi. Compare Urate of Ammonium Calculi.

53.66. Calculus of Uric Acid and some Urate of Ammonium. *Hunterian.*

A small circular disc-shaped stone consisting of uric acid and a trace of calcium oxalate in fine dense laminae, with a small centre which contains much urate of ammonium.

53.67. Calculus of Uric Acid and some Urate of Ammonium. *Hunterian.*

A small oval stone of pale uric acid, mostly of the granular form, with a small compact nucleus which contains urate of ammonium.

53.68. Calculus of Uric Acid and some Urate of Ammonium.*Hunterian.*

A small spherical stone of uric acid and traces of calcium oxalate in very fine laminae, very hard and dense. The nucleus and one or two of the laminae, which are much paler than the rest of the stone, contain urate of ammonium.

53.69. Calculus of Uric Acid and some Urate of Ammonium.*Hunterian.*

A small oval stone of uric acid and a trace of calcium oxalate in fine laminae, with a nucleus of paler material which is largely urate of ammonium.

53.70. Calculus of Uric Acid and some Urate of Ammonium.*Hunterian.*

A small stone of very irregular shape, probably renal; its substance is of very loose texture, being formed in laminae which are very irregular. It consists of uric acid with much organic matter, which burns with yellow flame and smell of burnt feathers—probably fibrin and mucus. It also evolves some ammonia on addition of hydrochloric acid from the presence in it of some urate of ammonium. Burns away completely.

53.71. Calculus of Uric Acid and some Urate of Ammonium.*Hunterian.*

Half of a very much flattened oval stone of considerable size, consisting of uric acid—partly granular, partly laminated—round a pale nucleus which contains some urate of ammonium. Tuberculated externally.

53.72. Calculus of Uric Acid and some Urate of Ammonium.*Hunterian.*

Half of a similar stone, which has a good deal of calcium oxalate in most of its layers, and is coarsely tuberculated externally. The centre is a nucleus of pale matter containing much urate of ammonium, enclosed in a sharply defined thin shell of dark brown calcium oxalate.

53.73. Calculus of Uric Acid and some Urate of Ammonium. *Hunterian.*

A calculus of uric acid and traces of calcium oxalate, round a nucleus about the size of a hazel nut, of very pale brown colour, and containing much urate of ammonium. Some phosphates externally.

53.74. Calculus of Uric Acid and some Urates and Phosphates. *Hunterian.*

A small flattened spherical calculus consisting of a uric acid nucleus, then numerous layers of uric acid and some calcium oxalate, dark brown in colour, and lastly a zone of pinkish softer material composed of urates and phosphates mixed.

53.75. Calculus of Uric Acid and some Urate of Ammonium. *Hunterian.*

A long oval calculus of considerable size consisting principally of uric acid, but evolving a small amount of ammonia from all its layers on addition of caustic potash. Its exterior to a large extent coated with dark brown organic matter.

53.76. Calculus of Uric Acid and some Urate of Ammonium and Phosphates. *Hunterian.*

An oval calculus of uric acid with a thin external shell of pale pink material which is principally mixed phosphates, but gives a distinct murexide reaction. The exterior of the calculus is roughly tuberculated and of a dark reddish-brown colour.

*SECTION II.***CALCULI CONSISTING PRINCIPALLY OF URATE OF AMMONIUM.**

In this section of the series have been placed fourteen specimens, the first two of which are each a number of the typical small urate of ammonium calculi of primary formation; the other eight are large calculi containing other matters besides urate of ammonium, but having peculiar characters which are due to the presence of a large

amount of that substance. The calculi of the first two specimens are small, of irregularly rounded shape, hard, but brittle and rather friable, of dirty white colour, and having a peculiar rough surface like that of a piece of wet clay which has been rolled with the fingers and then dried. All the calculi give the murexide test and evolve abundance of ammonia on addition of caustic potash. The two first burn quietly. The others, which are all very dense, hard, and brittle, decrepitate more or less violently on heating, a property supposed to be due to the separation of the ammonia from the uric acid in the midst of the hard substance. No attempt was made to determine the relative proportions of the urate of ammonium, other urates, and uric acid.

53.77. Urate of Ammonium Calculi.

Hunterian.

A number of the small earthy calculi which are said to be found only in the bladders of new-born and nursing infants, their history unfortunately not known. They are about the size of large peas. See the introductory paragraph for description.

53.78. Urate of Ammonium Calculi.

Hunterian.

A number of calculi similar to the preceding, but much smaller.

53.79. Urate of Ammonium Calculus.

Hunterian.

An oval calculus about the size of a filbert. It is formed throughout of very fine laminae, from dirty white to very pale brown in colour, very compact and hard and brittle. Its exterior is pale brown and nearly smooth. It gives the murexide reaction, evolves a large amount of ammonia on treatment with caustic potash, and decrepitates sharply before the blowpipe. It consists of a large amount of urate of ammonium mixed probably with other urates and uric acid, the relative proportions of which were not determined.

53.80. Calculus consisting largely of Urate of Ammonium.

Hunterian.

Half of a calculus rather larger than the preceding. Its centre is a small stone exactly like the preceding, giving strong reaction, of

urate of ammonium ; round this is a layer of loose textured pale brown material containing much organic matter which burns with a yellow flame, and outside all a very dense layer of darker coloured matter which consists of uric acid and calcium oxalate. The loose layer contains ammonium urate.

53.81. Calculus consisting largely of Urate of Ammonium.

Hunterian.

Half of a large oval calculus, a considerable amount of the outer layers of which has broken away, leaving its shape rather irregular. The centre is a calcium oxalate stone as large as a filbert. The rest consists of two wide layers of dense hard brittle matter of very pale brownish-white colour and two narrow layers of less compact reddish-brown matter. Both of these contain a large amount of urate of ammonium and some calcium oxalate, the lighter parts having the larger proportion of the latter.

53.82. Calculus consisting largely of Urate of Ammonium, with some Oxalate and Phosphates.

Hunterian.

A calculus nearly as large as a hen's egg, which consists of a large central stone of pale brown matter containing much urate of ammonium intersected by dark lines of calcium oxalate ; then a broad layer of pale pink fusible phosphates mixed with urate of ammonium ; and lastly a thin brown shell of calcium oxalate mixed with urate of ammonium. Its exterior has a rough, water-worn appearance.

53.83. Calculus of Urate of Ammonium, Uric Acid, and Calcium Oxalate.

Hunterian.

Half of a stone of irregular oval shape consisting of a central concretion composed of strata of hard pale matter like that composing the centre of the preceding ; it contains much urate of ammonium, divided by distinct narrow laminae of pure calcium oxalate, which is very hard and shows a great tendency to take the tuberculated form characteristic of oxalate calculi. Outside the last of these laminae is a broad zone of brown finely laminated uric acid mixed with calcium oxalate. Outside all a thin coat of organic debris containing some phosphates.

**53. 84. Calculus consisting largely of Urate of Ammonium,
with some Calcium Oxalate.** *Hunterian.*

Half of a calculus about the size of a hen's egg, composed of pale brown matter, which is hard and brittle but rather porous, and containing much urate of ammonium. Near the outside is a layer of several fine laminae of calcium oxalate, then again a thin shell of material like the centre, but containing some oxalate. The outside is rough and shows traces of phosphates.

53. 85. Calculus consisting largely of Urate of Ammonium. *Hunterian.*

A small calculus with a centre of the typical dense urate of ammonium, round which is a layer of saffron-coloured porous matter, for the most part uric acid, and lastly a layer of pale brownish-white matter similar to the centre, but containing also traces of calcium oxalate.

**53. 86. Calculus consisting largely of Urate of Ammonium,
with some Calcium Oxalate.** *Hunterian.*

An oval calculus about the size of a hen's egg, composed throughout of coarse granules only moderately firmly agglutinated together. The exterior is very roughly tuberculated, from being composed of these granules with less agglutinating material between them than there is inside the stone. The granules give the murexide and ammonia reactions, decrepitate violently before the blowpipe, and leave a small mineral ash which effervesces with hydrochloric acid.

53. 87. Calculus consisting largely of Urate of Ammonium. *Hunterian.*

A stone of quite irregular shape, composed of very soft porous pale brown material, which burns away completely before the blowpipe, and gives murexide and ammonia reactions. Appears to consist of urate of ammonium and uric acid, as the evolution of ammonia is not very abundant.

53.88. Calculus of Urate of Ammonium coated with Phosphates. *Hunterian.*

A small calculus consisting of a stone exactly like No. 53.79, enclosed in several distinct thin shells of mixed phosphates.

53.89. Calculus consisting largely of Urate of Ammonium coated with Phosphates. *Hunterian.*

A calculus about the size of a pigeon's egg, consisting of a centre of pale whitey-brown matter, largely urate of ammonium, enclosed in a shell of phosphates divided into several layers by thin laminae of calcium oxalate.

53.90. Calculus of Urate of Ammonium coated with Phosphates. *Hunterian.*

A calculus consisting of a stone similar to No. 53.88, but smaller, and having outside the layer of phosphates a shell of very hard white material which is not combustible nor fusible, and effervesces freely with cold hydrochloric acid—apparently calcium carbonate.

SECTION III.

CALCULI CONSISTING PRINCIPALLY OF CALCIUM OXALATE.

There are 45 specimens of this species of calculus in the museum. Very few of these are pure calcium oxalate, but in most it is the calcium oxalate part which gives character to the stone. One of the specimens consists of several small hard white smooth stones, a rare form of calcium oxalate calculus. In the rest the calcium oxalate portion is of round or oval shape, and has a very rough irregular surface covered with prongs and nodules (mulberry calculi). In colour they are of various shades of brown. From their roughness they cause much irritation in the bladder, and frequently bleeding, and therefore are often coated with blood-stained organic matter; one specimen in the collection illustrates this feature very strikingly (No. 53.96). Many of the calculi have a layer of uric acid round the oxalate stone, filling up its irregularities more or less; in these stones the surface may be quite smooth. The commonest form of nucleus is a small hard brittle stone of pale yellow colour, containing

much urate of ammonium. Several specimens are coated with mixed phosphates, which in one forms the principle bulk of the calculus. Calcium oxalate calculi are extremely hard. Before the blowpipe they swell up to a loose white or grey ash of calcium carbonate, which effervesces with hydrochloric acid, and has a strong alkaline reaction. Calcium oxalate dissolves in hydrochloric acid without effervescence, and is insoluble in cold acetic acid.

(a) *Calcium Oxalate, pure or nearly so.*

53.91. Calcium Oxalate Calculus.

Hunterian.

Half of a stone of irregular spherical shape, about the size of a pigeon's egg, showing the characteristic rough pronged exterior of the mulberry calculus. It has a small nucleus of uric acid. Some of its layers are of loose texture from the presence of much organic matter, others very dense and hard; pure calcium oxalate, except the nucleus.

53.92. Calcium Oxalate Calculus.

Hunterian.

A section of a mulberry calculus which has been considerably larger than a hen's egg, and of very irregular spherical shape, the prongs being very long. It is built up of fine laminae, of various shades of brown in colour, of pure calcium oxalate round a small nucleus of urate of ammonium. In the hollows of its exterior there is a deposit of mixed phosphates.

53.93. Calcium Oxalate Calculus.

Hunterian.

Half of a calculus consisting of pure calcium oxalate throughout, with the exception of a very little phosphate on its exterior. It is finely nodulated, and is built up of granules and laminae rather loosely put together. Broken at one end.

53.94. Calcium Oxalate Calculus.

Hunterian.

A small oval calculus, uncut, showing the very rough nodulated surface.

53.95. Calcium Oxalate Calculus.*Hunterian.*

A spherical stone about the size of a pigeon's egg, uncut, very rough with fine tubercles.

53.96. Calcium Oxalate Calculus.*Hunterian.*

A small very rough mulberry calculus with its prongs buried in a thick layer of fibrinous material. The prongs were doubtless pretty thoroughly concealed and protected by this layer when it was fresh and wet.

53.97. Calcium Oxalate Calculus.*Hunterian.*

Five stones of various shapes about the size of peas, of dirty white colour, and very smooth and polished externally. The largest is broken. It consists of a centre of brown matter like old blood clot, and a shell, about 2 mm. thick, of pure calcium oxalate in very fine laminae. It is very hard. A fragment decrepitates before the blow-pipe, but the powder swells up to a grey ash which effervesces with hydrochloric acid. The calculus gives no murexide reaction; it is soluble without effervescence in cold hydrochloric acid, but insoluble in acetic acid; gives no evolution of ammonia on moistening the powder with caustic potash. It is calcium oxalate, decrepitating probably from the presence of a good deal of organic matter in it.

(b) *Calculi of Calcium Oxalate and Uric Acid
or Urates.*

53.98. Calcium Oxalate and Uric Acid Calculus.Hunterian.*

A calculus of irregular oblong shape with four stout prominences, from its appearance a kidney stone. Two of the prominences were formerly capped with small calculi; the facets on which they rested are highly polished. It consists of a central oxalate stone, then several layers of uric acid and oxalate mixed, and a thin outer shell of nearly pure oxalate. (*Hunterian Plate IX., fig. 3.*)

53.99. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

Half of a dark brown stone about the size of a hen's egg, of blunt oval shape, consisting of a large calcium oxalate calculus with small nucleus of uric acid, enclosed in an outer shell of uric acid mixed with some oxalate, which varies in thickness from 2 to 10 mm. The mulberry calculus is round, but the whole stone is oval from the uric acid being thin at the sides and thick at both ends. The exterior is very rough, but the points are not so sharp as in a simple calcium oxalate calculus, being more or less rounded off by the shell of uric acid.

53.100. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

A stone very similar to the preceding, consisting of a mulberry calculus with small urate of ammonium nucleus and thin external shell of uric acid.

53.101. Calcium Oxalate and Uric Acid Calculus.Hunterian.*

Similar to the preceding, but having a very much thicker shell of uric acid, from which circumstance its exterior, though rough, is not tuberculated like that of the preceding. The nucleus and some very pale layers of the stone contain urate of ammonium. In section it is a very pretty stone from the various shades of yellow and brown and the crenated form of its different laminae. (*Hunterian Plate XVI., fig. 7.*)

53.102. Calcium Oxalate and Uric Acid Calculus.Hunterian.*

An oval stone rather larger than a hen's egg, very similar to the preceding. The nucleus is urate of ammonium, the oxalate stone is spherical, and the layer of uric acid thick enough to cover the points entirely. Its exterior has a rough water-worn appearance.

53.103. Calcium Oxalate and Uric Acid Calculus.Hunterian.*

A calculus very similar to the preceding, but with the shell of uric acid formed only on the ends and in two bands running from

one end to the other, leaving two considerable areas of the sides in which the points of the oxalate stone are bare. Nucleus: urate of ammonium. (*Hunterian Plate XIV.*, figs. 5 and 6.)

53.104. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

Half of a large oval stone cut across. It consists of a spherical mulberry calculus about the size of a marble, with small urate of ammonium nucleus and a very thick outer shell of pure uric acid. Its exterior is smooth. There is a very distinct boundary between the oxalate portion and the uric acid portion, in the form of an irregular space, which contains some fibrinous debris and mixed phosphates.

53.105. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

A large flattened oval stone cut longitudinally, showing exactly the same structure as the preceding. The uric acid part contains traces of calcium oxalate; its exterior is finely tuberculated.

53.106. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

An oval stone about the size of a hen's egg. It has a central mass, of considerable size, of granular uric acid; then a broad zone, which is partly laminated, partly in irregular masses and bands, consisting of uric acid and a very large proportion of calcium oxalate. Outside this is a fairly thick layer of dense laminated uric acid with traces of oxalate. The exterior of the stone is very roughly tuberculated.

53.107. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

A somewhat smaller flattened oval stone having a small calcium oxalate calculus for its nucleus, and from that outwards consisting of uric acid and a very large proportion of calcium oxalate in very fine close laminae. It is an extremely hard stone. Its exterior

is partly smooth, partly finely tuberculated. The tubercles have a finely polished translucent appearance; they consist of practically pure calcium oxalate.

53.108. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

A small spherical stone consisting of a relatively larger centre of uric acid and urate of ammonium, then a layer of dense dark brown calcium oxalate projecting in short prongs in the usual way, and lastly, on the ends of the prongs, bunches of fine crystals of calcium oxalate, giving to the stone an exceedingly rough and irregular exterior.

53.109. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

A small irregularly oval stone. Its centre consists of calcium oxalate, mixed with a good deal of uric acid, in fine laminae, very compact and hard; outside that a layer of bunches of calcium oxalate crystals, similar to the exterior of the preceding.

53.110. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

Half of a spherical stone similar in composition to the preceding. The outer layer of crystalline calcium oxalate more uniform and less aggregated into bunches than in the preceding. The crystals coarser; also in parts overlaid with a little uric acid; very rough.

53.111. Calcium Oxalate and Uric Acid Calculus.

Hunterian.

Half of a small stone of irregular shape, consisting of a centre of uric acid and urate of ammonium, then fine layers of calcium oxalate mixed with some uric acid, and an external, rather earthy looking, layer of calcium oxalate in irregular masses which show a decidedly crystalline tendency, similar to that in the preceding.

53.112. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

Half of a calculus of irregular shape. The dense finely laminated central parts are uric acid with large proportion of oxalate; the nodules of the exterior calcium oxalate.

53.113. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

Half of a small very long thin calculus, apparently formed by the soldering together, end to end, of two small oval calculi. The nuclei are of uric acid and urates; the rest of the stone, calcium oxalate with traces of uric acid.

53.114. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

Half of a small oval stone composed of calcium oxalate in very fine particles round a nucleus of uric acid and ammonium urate.

53.115. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

A small very dark brown calculus like a date stone, consisting of a centre of soft urate of ammonium, then a layer of uric acid and oxalate and an outer shell of pure oxalate, which has the dark brown colour.

53.116. Calcium Oxalate and Uric Acid Calculus.*Hunterian.*

A stone about the size of a date stone, consisting of calcium oxalate round a nucleus of uric acid and urate of ammonium.

53.117. Calcium Oxalate Calculus—from Urethra.

A similar stone uncut, "From urethra by incision. Patient of Dr. Wilson. Ap., 1852." Donor of stone unknown; *vide* introduction to Series.

53.118. Calcium Oxalate Calculus—from Urethra.

A stone from the same collection as the preceding. It is about the size of a damson stone, and flattened like it; measures 20 by 14 by 8 mm. Pale brown in colour, hard and polished. "Duffy; by dilatation of the urethra. Dec., 1845."

53.119. Calcium Oxalate Calculus—from Urethra.

Two small oval stones with the typical rough exterior of mulberry calculi. "Hart; ejected from urethra"; the smaller in 1829, the larger in 1831. From the same collection as the preceding.

53.120. Calcium Oxalate Calculus—from Urethra.

An irregularly rounded stone about the size of a pea, "from the urethra by incision. 1840." From the same collection as the preceding.

53.121. Calcium Oxalate Calculus. Renal Colic.

J.H.T., 1896.

A calculus of irregular oval shape, not much bigger than a hemp seed, consisting of calcium oxalate in small sharp pointed particles. It was passed *per urethram* by a working miner at Rio Tinto, Southern Spain, after a severe attack of typical renal colic lasting several hours. The pain was felt most in the left loin; it was more or less constant but rising to severe spasms, and darting down to the left testicle, which was strongly drawn up during the spasms. The pain was partly relieved by a hypodermic injection of morphia. It entirely ceased abruptly about half an hour after this was administered, and the calculus was passed along with a large amount of urine a few minutes later.

(c) *Calculi consisting of Calcium Oxalate, or Calcium Oxalate and Uric Acid with Layers of the Fusible Mixed Phosphates.*

53.122. Calculus of Calcium Oxalate, Uric Acid, and Phosphates.

Hunterian.

A large stone of blunt oval shape, consisting of calcium oxalate round a nucleus of uric acid and urate of ammonium, coated in parts

with mixed phosphates. There is an outside layer about 2 mm. thick, which is extremely hard, translucent, and showing traces of radiate crystallization. It consists of pure calcium oxalate. The surface of this is smooth and polished and studded with low rounded nodules, which are also smooth and polished.

***53.123. Calculus of Calcium Oxalate and Mixed Phosphates.** *Hunterian.*

Portion of a calculus, consisting of a mulberry calculus about the size of a damson, enclosed in a shell of mixed phosphates about 1.5 cm. thick, which has been removed from one end to show the rough exterior of the oxalate stone. (*Hunterian Plate XVI, fig. 6.*)

53.124. Calculus of Uric Acid (and Urate of Ammonium), Calcium Oxalate, and Phosphates. *Hunterian.*

Half of a mulberry calculus of very irregular shape, the prongs to a large extent buried in phosphates. The central parts of the stone are for the most part of a very light colour, the lightest layers containing much urate of ammonium, the darker uric acid and calcium oxalate.

53.125. Calcium Oxalate Calculus coated with Phosphates. *Hunterian.*

A mulberry calculus with relatively large centre of urate of ammonium, coated with phosphates so thickly as almost to bury its prongs though they happen to be very long.

53.126. Calcium Oxalate Calculus coated with Phosphates. *Hunterian.*

Half of a similar calculus of smaller size. The centre and a white line about the middle of the oxalate portion contain ammonium urate.

53.127. Calcium Oxalate Calculus coated with Phosphates. *Hunterian.*

Half of a calculus similar to the preceding, slightly smaller.

53.128. Calcium Oxalate Calculus coated with Phosphates.*Hunterian.*

A small spherical stone of similar composition coated thinly with phosphates.

53.129. Calcium Oxalate Calculus coated with Phosphates.

An oblong calculus nearly as large as a pigeon's egg, uncut ; most of its exterior is greyish-white from the presence of a thin shell of mixed phosphates ; but where this is imperfect it is nearly black, and made up of low rounded tubercles, smooth, polished and translucent, which consist of pure calcium oxalate and are very hard.

53.130. Calculus of Calcium Oxalate, Ammonium Urate, and Phosphates.*Hunterian.*

A calculus of flattened oval shape, rather larger than a pigeon's egg, consisting of a spherical calcium oxalate calculus about the size of a marble, with urate of ammonium nucleus, enclosed in a thick shell of pale uric acid with a considerable amount of urate of ammonium, and lastly a thin outer coat of mixed phosphates.

53.131. Calcium Oxalate and Uric Acid Calculus coated with Phosphates.Hunterian.*

Half of a small oval calculus, consisting of calcium oxalate mixed with some uric acid round a nucleus of uric acid, covered on one side by a mass of phosphates. (*Hunterian Plate XVIII.*, fig. 8.)

53.132. Calcium Oxalate Calculus coated with Phosphates. From Urethra.*Hunterian.*

"A stone which stuck more than a week in the urethra in a Smithfield boy. 1746." A stone of rather irregular oblong shape, measuring 18 by 13 by 6 mm. It consists of a shell of mixed phosphates with traces of uric acid (or urate of ammonium) enclosing a harder substance which is principally calcium oxalate ; uncut.

53.133. Calculus of Uric Acid, Calcium Oxalate, and Phosphates.Hunterian.*

Half of a spherical calculus, 3·7 cm. in diameter, with its outer layers broken away at one side. The main part of it is a

calcium oxalate calculus with a nucleus containing uric acid and urate of ammonium. The outer layer of this is loose and soft, and contains some phosphates; then follows a white layer about 1 mm. thick of soft mixed phosphates, then a greyish-white layer mixed with oxalate, and lastly an outer shell of pure hard dark brown calcium oxalate. (*Hunterian Plate XVI.*, fig. 8.)

53.134. Calculus of Calcium Oxalate, Uric Acid, and Phosphates. *Hunterian.*

Half of an oval calculus measuring 3·4 by 2·1 cm. The centre is a small oval calculus built up of dark brown and yellow laminae of calcium oxalate with a trace of uric acid. Then follows a very loose layer, thick at the ends, thin at the sides, of hard granules with softer brown material between, also calcium oxalate with a good deal of uric acid; and lastly, a shell about 3 mm. thick of moderately hard dense finely laminated pinkish-white matter, which appears to be mixed phosphates, principally calcium phosphate and some calcium oxalate. Before the blowpipe it blackens, and fuses only under very strong heat. It is soluble in hydrochloric acid, and the solution, on neutralizing with ammonia, throws down an amorphous precipitate with a few triple phosphate (knife rest) crystals here and there. It is to some extent but not completely soluble in acetic acid.

***53.135. Calculus of Calcium Oxalate and Phosphates. From Bladder of Hog.** *Hunterian.*

A note in William Hunter's handwriting says: "This stone was brought to me by a butcher, who found it in a hog's bladder. He observed that there was one stone within another, or something loose within, because when shaken there was a sensible rattling noise. Upon cutting it through I found the cavity contained several small stones and sawdust. I was at that instant called out in such a hurry that I had neither time to lock it up nor recollection to desire that nobody might disturb it, and when I came home I found that it had been taken up by some ignorant person, the small stones had tumbled out, and the room had been swept." The calculus is of perfectly spherical shape, 4 cm. in diameter. The cavity is large enough to contain a marble (2 cm.). It has a lining of dark rusty brown coloured calcium oxalate, which forms

a hard shell about 5 mm. thick. The calcium oxalate gradually becomes more mixed with phosphates, and the exterior of the stone is white, composed of the fusible compound—mixed phosphates. (*Hunterian Plate XX.*, fig. 1.)

SECTION IV.

CALCULI CONSISTING PRINCIPALLY OF MIXED PHOSPHATES— THE FUSIBLE CALCULUS OF WOLLASTON.

These calculi are composed of a mixture of the normal phosphate of the alkaline earths (phosphate of calcium and magnesium—principally the triphosphates), with triple phosphate (magnesium-ammonium phosphate). They are as a rule of secondary formation, round a nucleus consisting of a calculus of one of the preceding species or (much more rarely) a foreign body. They usually contain also some calcium oxalate and ammonium urate, a considerable amount of organic debris, and occasionally some calcium carbonate; the last ingredient especially in stones from the lower animals. Their colour is usually a dingy white, sometimes with a pinkish tinge, or grey; the exterior is always rough. In texture they are more or less chalky; they vary greatly in density and hardness; generally soft and friable. Before the blowpipe they blacken more or less from the combustion of the organic matter in them, and fuse very easily to a grey or white enamel. They dissolve in hydrochloric acid without effervescence (unless calcium carbonate be present), and give a precipitate on neutralizing with ammonia, which is crystalline in the case of triple, amorphous in the case of the earthy phosphates. There are twenty-nine specimens in the collection which have been classified as of this species, but in addition many calculi in other parts of the series contain mixed phosphates.

(a) *Nucleus a Calculus of some other species, or of
Phosphates mixed with other materials.*

53.136. Mixed Phosphate Calculus.

Hunterian.

Half of a stone as large as a hen's egg, of flattened spherical shape, consisting of a small calcium oxalate and ammonium urate calculus enclosed in a thick shell of the fusible compound—largely triple phosphates.

53.137. Two Mixed Phosphate Calculi—from one Bladder.Hunterian.*

The larger stone is very similar to the preceding, but slightly smaller; flattened on one end. The smaller is of oval shape flattened on the side which lay in apposition with the flattened surface of the other. Both consist of a small nucleus of uric acid and calcium oxalate enclosed in a thick shell of mixed phosphates, very soft, chalky and fusible—for the most part triple. (*Hunterian Plate XII.*, figs. 4 and 5.)

53.138. Mixed Phosphate Calculus.*Hunterian.*

A calculus of irregularly oval shape, composed of fusible phosphates of very loose texture, mixed with some calcium oxalate and uric acid (or ammonium urate) round a fairly large nucleus of calcium oxalate with traces of uric acid.

53.139. Mixed Phosphate Calculus.*Hunterian.*

A calculus of rounded tetrahedral shape, with nucleus of uric acid and calcium oxalate. The phosphates of very close texture, soft and chalky, and finely laminated.

53.140. Mixed Phosphate Calculus.*Hunterian.*

Half of a stone almost identical in size, shape, and composition with the preceding.

53.141. Mixed Phosphate Calculus.Hunterian.*

A stone nearly as large as a hen's egg, of uneven oval shape, being straighter on one side, consisting of white and grey layers of mixed phosphates round a small calculus of granular mixed uric acid and calcium oxalate, with nucleus of urate of ammonium. (*Hunterian Plate XVIII.*, fig. 1.)

53.142. Mixed Phosphate Calculus.Hunterian.*

A calculus larger than a hen's egg, of irregular shape. It has as a nucleus an oval uric acid stone as large as a marble, placed eccentrically. Alongside this, occupying the centre, is a mass of

extremely soft fusible phosphates mixed with calcium carbonate which effervesces freely with hydrochloric acid. The rest of the calculus is mixed phosphates. (*Hunterian Plate XVIII.*, fig. 3.)

53.143. Mixed Phosphate Calculus.

Hunterian.

Half of a calculus as large as a goose's egg, broken at one end, consisting of mixed phosphates in regular laminae round a uric acid stone nearly as large as a hen's egg. The phosphates are of pinkish-white and pale grey colour.

53.144. Uric Acid and Mixed Phosphate Calculus.

Hunterian.

A small stone with relatively large nucleus of granular uric acid and calcium oxalate.

53.145. Mixed Phosphate Calculus.

Hunterian.

A large calculus of irregular shape with nucleus of pale uric acid and ammonium urate.

53.146. Mixed Phosphate Calculus.

Hunterian.

A small irregularly shaped calculus with a nucleus of ammonium urate and mixed phosphates rather denser than the body of the calculus. It almost amounts to a calculus of mixed phosphates of primary formation.

***53.147. Mixed Phosphate Calculus.**

Hunterian.

Half of a long oval calculus consisting of a small nucleus of ammonium urate, then a considerable, well-defined, yellowish mass of the same matter mixed with fusible phosphates, and the external layers phosphates with distinct trace of ammonium urate. (*Hunterian Plate XVIII.*, fig. 2.)

53.148. Mixed Phosphate Calculus.

Hunterian.

An oval calculus very like the preceding, the central parts white and containing less urate and more phosphate.

***53.149. Mixed Phosphate Calculus.** *Hunterian.*

A calculus of rounded tetrahedral shape, about the size of a pigeon's egg, consisting of a relatively large oval mass of hard ammonium urate and phosphates enclosed in an irregular layer of the loose soft phosphates which gives the shape to the stone. (*Hunterian Plate XVIII.*, figs. 4 and 5.)

53.150. Mixed Phosphate Calculus. *Hunterian.*

A small flattened oval calculus of similar composition.

53.151. Mixed Phosphate Calculus. *Hunterian.*

A small oval calculus of similar composition, but showing a minute nucleus which consists of ammonium urate without any phosphates.

53.152. Mixed Phosphate Calculus. *Hunterian.*

Small flattened oval stone similar in composition to No. 53.149.

53.153. Several Mixed Phosphate Calculi—from the Bladder. *Hunterian.*

The specimen consists of a stone about the size of a marble, of rounded shape with several small facets, and a number of small calculi which seem to have fitted into the facets. The large stone consists of a centre of urate of ammonium and phosphates, then layers of very soft phosphates with traces of calcium carbonate, and a shell of several layers of harder chalky yellowish phosphates, which fuse less readily, and contain much urate of ammonium. The little stones are of similar composition.

53.154. Mixed Phosphate Calculus.

An oval stone measuring 3.2 by 1.8 cm. composed of mixed phosphates with distinct traces of urate of ammonium round a nucleus of urate of ammonium. "From a patient of Dr. P. Stewart. Found in perinaeum when laying open urethra to reach bladder in a case of retention and afterwards extravasation of urine."

53.155. Mixed Phosphate Calculi.Hunterian.*

Five tetrahedral calculi, of very regular shape with flat sides and clean cut edges. "These stones were found in the bladder of a dog." They measure 2.6 cm. on each edge. One of them is cut; it has had a small round nucleus, which is now absent. The bulk of the stones consists of a material very like chalk in colour, hardness, and texture. It consists largely of triple phosphates, but is very readily fusible as if it contained an appreciable admixture of the earthy phosphates. (*Hunterian Plate XX.*, figs 3 to 8.)

53.156. Mixed Phosphate Calculi.*Hunterian.*

A number of small calculi, several broken, in shape and composition closely resembling the preceding. Contain also some calcium carbonate.

53.157. Mixed Phosphate Calculi.*Hunterian.*

Four and a half calculi of rounded shape, irregularly faceted, in composition and appearance like the preceding.

53.158. Mixed Phosphate Calculi.*Hunterian (?)*.

A small calculus very like the preceding, accompanied by a note (not *Hunterian*)—"calculus containing carbonate of lime, phosphate of lime, triple phosphate and uric acid"; the last probably in the form of urates.

53.159. Mixed Phosphate and Oxalate Calculi—from the Kidney.*Hunterian.*

Two calculi and one or two fragments showing the characteristic irregular branched shape of renal calculi. They are both composed of white mixed phosphates and dark brown calcium oxalate, with some uric acid, combined in irregular masses and layers. Not cut.

53.160. Mixed Phosphate Calculus—from the Kidney.*Hunterian.*

A stone somewhat similar in shape to the preceding, its exterior composed of mixed phosphates. Not cut.

53.161. Mixed Phosphate and Oxalate Calculus—from the Kidney.*Hunterian.*

A smaller calculus, evidently from its branched shape renal, composed of mixed phosphates round a mass, apparently spherical, of calcium oxalate. Not cut.

*(b) Nucleus a Foreign Body.****53.162. Mixed Phosphate Calculus with Nucleus a Piece of Lead.***Hunterian.*

A heart-shaped calculus nearly as large as a hen's egg, of the fusible compound, largely triple phosphates, with a good deal of urate of ammonium. Its nucleus is a piece of lead like a portion of a bougie, about 2 mm. in diameter; probably a portion of one of the old-fashioned lead bougies. There is a straight portion about 2.5 cm. long, forming the axis of the calculus, with a hook at one end which has been coated only to a very slight extent, and that too with brown calcium oxalate. (*Hunterian Plate XIX.*, fig. 10.)

53.163. Mixed Phosphate Calculus with Nucleus a Lock of Hair.Hunterian.*

An oval mass of mixed phosphates as large as a pigeon's egg, broken at one end showing a lock of hair (human)—part embedded in it, part free and thinly crusted with the same material. "A lock of hair incruited with calculous matter." (*Hunterian Plate XIX.*, fig. 8.)

53.164. "A Lock of Hair Incruited with Calculous Matter."Hunterian.*

A large lock of human hair thinly crusted with mixed phosphates. (*Hunterian Plate XIX.*, fig. 1.)

SECTION V.

CALCULI COMPOSED PRINCIPALLY OF MAGNESIUM-AMMONIUM
(TRIPLE) PHOSPHATE.

Five calculi have been placed under this heading. They are not absolutely pure triple phosphate; all contain a trace of the earthy phosphate, and one of them a considerable amount of some carbonate. Two of them are from the lower animals, the history of the other three is unknown.

***53.165. Triple Phosphate Calculus. From the Bladder
of a Hog.** *Hunterian.*

A calculus of flattened spherical form, 3·9 cm. in its largest diameter. There is a note in Hunter's handwriting as follows: "This calculus was given to me by Mr. Girl, Surgeon. It was found in the bladder of a hog. The surface was made of small crystallizations, which when first taken out were transparent and bright like crystal, in which state Mr. Girl had seen it, but by careless preservation it became opaque and white." It is composed throughout of nearly pure triple phosphates in long radiating crystals fairly compactly agglutinated together. (*Hunterian Plate XX., fig. 2.*)

53.166. Triple Phosphate Calculus. *Hunterian.*

A calculus almost identical with the preceding in size, shape, and composition.

53.167. Triple Phosphate and Carbonate Calculus.

A spherical stone about the size of a marble, uncut, similar in appearance to the preceding. "Found in a hog's bladder. Presented by Thomas Kennedy. 7th Dec., 1815." Consists principally of triple phosphates, but is readily fusible as if it contained a certain amount of the earthy phosphates. Also effervesces somewhat with hydrochloric acid from the presence of some carbonate, probably of calcium.

53.168. Triple Phosphate Calculus.*Hunterian.*

Half of a flattened oval calculus about the size of a pigeon's egg, built up of concentric laminae of crystalline triple phosphates. The crystals both on the exterior, which is rough, and in the section are of a waxy white colour, rather like a pure cholesterine gall stone (*vide* Series 52). It is very soft. Before the blowpipe it burns away, without melting, to a considerable extent, and the residue fuses readily. By other tests it is found to be principally triple phosphates. History unknown, perhaps not urinary.

53.169. Triple Phosphate Calculus.*Hunterian.*

A calculus of rounded tetrahedral form, built up of a number of well-defined laminae of phosphates nearly all triple, but readily fusible from the presence of some of the earthy phosphates, round a small compact nucleus of ammonium urate.

SECTION VI.

CALCIUM CARBONATE CALCULI.

Of this kind of calculus there are six specimens in the collection, all from the lower animals. Calculi of calcium carbonate alone are seldom found in man, but it appears as an ingredient of some urinary calculi, and of prostatic, salivary, pancreatic, and some biliary calculi. They are recognized by the property of dissolving completely or in great part in acids with effervescence. Before the blowpipe they blacken from combustion of their organic parts, and leave a large white ash of quicklime which is not fusible.

53.170. Calculus of Calcium Carbonate and some Phosphates.*Hunterian (?)*.

“Part of a stone taken out of the bladder of a horse when dead. *Ex dono* D. Phillips, M.D.” It has been a very large stone of oval shape, considerably larger than a goose's egg. The central parts are made up of coarse granules closely agglutinated together. They consist of calcium carbonate, some phosphates, and much organic matter; no uric acid. Round this is a thick shell of very dense

finely laminated nearly pure calcium carbonate. The outer parts are very pale brown in colour, the central darker.

53.171. Calcium Carbonate Calculus. Horse (?). *Hunterian.*

A large dark brown calculus of calcium carbonate in coarse granules, fairly compactly agglutinated together, round a small nucleus of laminated calcium carbonate. The stone consists of two parts united by a comparatively narrow neck. The larger is a flattened spherical mass 9·5 cm. in diameter, the smaller a rather irregular mass (partly cut away), about the size of a pigeon's egg. Probably from a horse.

53.172. Calcium Carbonate Calculus. Renal. Horse.

Hunterian.

A large "kidney stone from a mare." A long curved irregularly lobulated mass of calcium carbonate—part granulated, part dense—measuring 14·5 cm. in length in a straight line, and in thickness from about 2 to 5 cm.

53.173. Calcium Carbonate Calculi. Hog.

Hunterian.

A small bottle full of "stones from a hog's bladder." Little globular bodies from the size of a mustard seed to that of a pea, the small ones pale brown, the large ones dark brown in colour, with a pearly lustre externally. They are very hard and are composed of calcium carbonate and organic matter. Very like human prostatic calculi.

53.174. Calcium Carbonate Calculi. Hog.

Hunterian.

Another of the same.

53.175. Calcium Carbonate Calculi. Hog.

Hunterian.

Some more of the same lying loose in a small box.

Of the Rarer Urinary Calculi—cystin, xanthin, calcium phosphate, urostealith, and fibrin—the museum contains no specimens.

SECTION VII.

PROSTATIC CALCULI.

See Nos. 43.25 and 43.26.

CASTS OF CALCULI.

53.176. Model of a Vesical Calculus.*Hunterian.*

"The model of a stone weighing 4 oz. extracted by Mr. Girle and Baker from the bladder of Eliz. Lyndsey, aged 22 years. Aug. 1747. N.B.—She recovered and was well after it." The model is of a curious rounded triangular shape like the female bladder when partly distended.

53.177. "The Models of 2 Stones taken from a Dead Man."*Hunterian.*

The large one larger than a goose's egg, the small one nearly as large as a hen's egg.

53.178. "A Gross Imposition."*Hunterian.*

"As an Appendix to the Calculous Concretions may be here placed a considerable oblong piece of slate; said to have been passed from a boy's bladder (an imposition)."

Also a note in the box—"Said to be passed from a boy's bladder, who had swallowed paint. A gross imposition. July, 1779."

ADDENDA.

Page 517, line 21, add *AA.31a* after *Hunterian* in the title of the preparation.

Page 724. No. 43.169 is the original of figs. 1 and 2 of Plate XXXIV. of Hunter's *Gravid Uterus*.

PRINCIPAL REFERENCES.

LIST OF ABBREVIATED TITLES OF WORKS frequently referred to in the Catalogue. *Vide* also Introduction and Index of Names.

Cheselden's Osteographia refers to *Osteographia, or Anatomy of the Bones*, by William Cheselden, F.R.S., folio, London, 1733. (Series 5 and 6.)

Description of the Gravid Uterus refers to *An Anatomical Description of the Human Gravid Uterus*, by William Hunter. The numbers of the pages apply to the edition by Edward Rigby, 8vo, London, 1843.

Hewson's Works refers to the Sydenham Society's edition, by George Gulliver, F.R.S., 4to, London, 1846.

Hunter's Gravid Uterus refers to *The Anatomy of the Human Gravid Uterus exhibited in Figures*, by William Hunter, elephant folio, Birmingham, 1774, and other editions.

John Hunter on the Teeth refers to the *Treatise on the Natural History and Diseases of the Human Teeth*, Palmer's edition of *John Hunter's Works*, Vol. II., 8vo, London, 1835.

John Hunter's Animal Economy refers to *Observations on Certain Parts of the Animal Economy*, Op. cit., Vol. IV., 1837.

Lectures, MS. R.C.S. Eng. refers to sets of Students' Notes of William Hunter's Lectures in the Library of the Royal College of Surgeons of England. No. 42, c. 28 and 29 are on Anatomy; No. 42, c. 31 on Midwifery. The pages refer to the original MSS., and to the numbers inserted in red in the text of the copies in the University of Glasgow.

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